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DETROIT

NATIONAL PETROLEUM NEWS

Refining Technology EDITION

In this Issue...

● Regulation of Drilling Advised

Need for bringing the drilling of new wells into the proration program is seen by two special committees which reported to the directors of the American Petroleum Institute at its semi-annual meeting in Wichita.....27

● Poly Unit Cuts Crude

Atlantic's new polymerization plant increases refinery operating flexibility, and additional capacity cuts crude purchases over 3000 barrels per day. Daily plant yield is 1850 barrels of 76-78 octane number blending naphtha R-259

● Tons of Acid—No Corrosion

Nearly 35 tons per day of concentrated sulfuric acid made from refinery hydrogen sulfide, at operating cost of $3.25 per ton R-268

● Remove H_2S With Amines

Amines, such as ethanolamines, derivatives of ammonia, absorb hydrogen sulfide and carbon dioxide from plant gases efficiently, without the necessity for costly exactness of control. The plant is fully automatic R-276

● Phosphate Removes H_2S

Tri-Potassium Phosphate in either dilute or concentrated solutions, removes H_2S quantitatively from petroleum gases. Four plants now operating, and one under construction R-280

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JUNE 1, 1938

Saving WITH Security

Fig. 143A

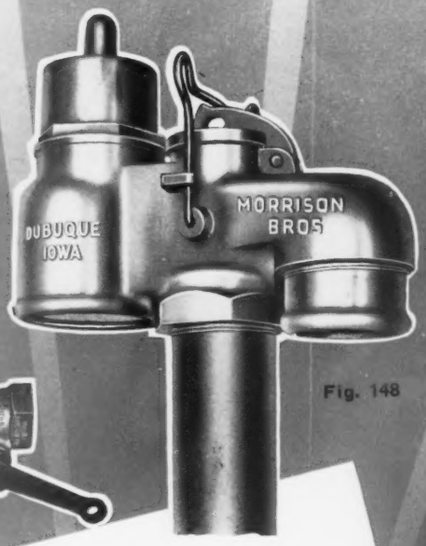


Fig. 148

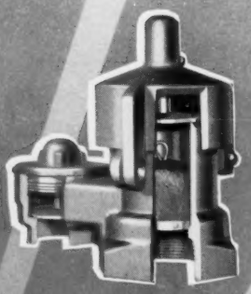


Fig. 147

Fig. 143

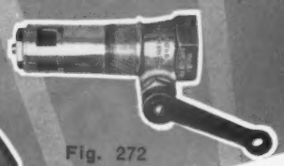


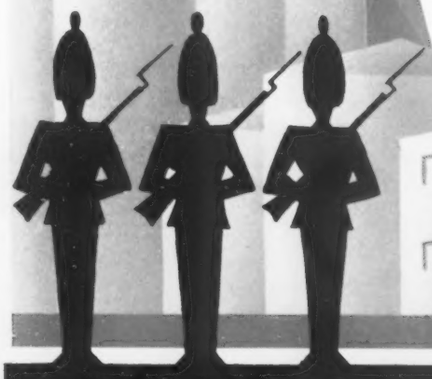
Fig. 272

Fig. 153A

It is an important thing to prevent huge losses through endless escaping vapors. But to prevent these losses in an absolutely safe way makes this saving most desirable.

Morrison Bros. Vent Valves, Escapement Valves, and Emergency Valves will accomplish this saving and security at every bulk plant. Before the summer heat surprises you with evaporation losses, investigate these excellent appliances. These valves are ready to go to work for you now.

Full information and prices will be gladly furnished.



MORRISON BROS. COMPANY

OIL EQUIPMENT HEADQUARTERS

DUBUQUE, IOWA

Presenting—

ON THE WALL
The Champion VEND-A-PLUG is also designed to hang on the wall when counter space is not available.

THE NEW—PRACTICAL CHAMPION VEND-A-PLUG MERCHANDISER

ON THE COUNTER
The Champion VEND-A-PLUG takes up very little space, keeps the spark plugs constantly before customers, provides an efficient service stock with size chart.

For Dealers Who Want More Profit

At last! Here is a merchandiser that really displays spark plugs. Hang it on the wall. Stand it up on your counter. Place it wherever it will do the best job, and best suit your convenience or space limitations. It's *practical.*

The new Champion VEND-A-PLUG comes packed with an assortment of 50 Champion Spark Plugs which will service 90% of all cars and trucks. Capacity 80. It's *practical.*

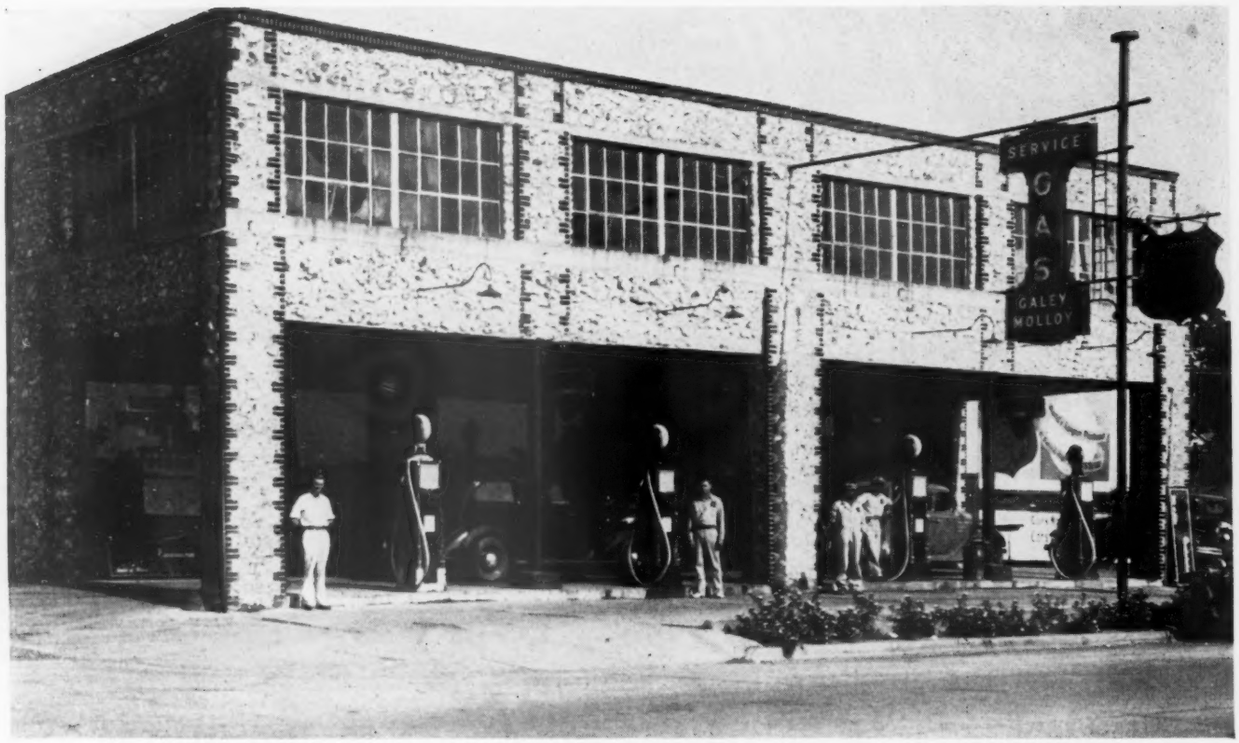
The Champion VEND-A-PLUG is packed with an assortment of forceful, dealer helps. It's *practical!*

Your cost, complete	$20.80
Your profit	11.70

The new Champion VEND-A-PLUG will last indefinitely. Kept on display it will continue to sell Champion Spark Plugs and multiply your profits because—it's *practical!*

Champion Spark Plugs outsell throughout the world because they're better spark plugs. They are universally conceded to be one of the fastest selling items in any dealer's stock. The turnover is many times a year, giving dealers steady multiple profits. Call your jobber salesman for a Champion VEND-A-PLUG merchandiser now and start making more and steadier profits with Champions.

N.P.N. says this is an advertisement but we say it's national petroleum news



At this modern service station operated by Galey and Molloy at Tahlequah, Oklahoma, gallonage has increased by leaps and bounds since their recent change in source of supply

Adding 33% to Sales in One Year

is the record of this Tahlequah, Oklahoma Jobber

THE Galey Oil Company, founded in 1921 by H. A. Galey, built the first drive-in filling station in the city of Tahlequah, Oklahoma. A year later, Mr. Molloy joined Mr. Galey to form the partnership of Galey & Molloy.

Seventeen years is a long time for a concern to have been jobbing petroleum products, and the ability of this concern to weather the various hard times during this period of years is an indication of its excellent management. Galey & Molloy are well qualified to talk about gasoline brands, for they have handled no less than five different major brands during their career as oil jobbers. So when Mr. Molloy writes us about their 33% gain with Phillips 66, we pay attention.

Steady Gallonage Increase

"In years past we have handled several brands of gasoline . . . but we have enjoyed the best gallonage since we began to sell Phillips 66. We unloaded our sixth car of Phillips 66 gasoline June 7, 1935, and you can see from the above record that our gallonage has been increasing steadily since that time."

The "above record" he refers to is a complete story in itself. After three years of satisfactory but static gallonage figures, we come to the 1935 record—and from then on the sales climb. Last year—1937—Galey & Molloy were unloading nearly a car a month more gasoline and kerosene than they were before they changed to Phillips 66.

Business Continues Good

Perhaps business was good for you in 1937. Quite a few oil jobbers showed substantial gains that year. But there are two more chapters to Galey & Molloy's story. In 1936, their first full year with Phillips 66, these jobbers had better than a 33% increase in gallonage over the previous year. This year their business has survived the current "recession" in good shape, too, and it looks as though they were headed for new records in 1938. That all adds up to something. Phillips 66 will build sales for you steadily over a long period.

You Can Boost Your Gallonage

Every jobber wants to keep his sales curve on the upward trend. Every jobber knows that these days it takes a mighty good product along with good advertising and hard-hitting selling to keep ahead of competition. Phillips has a good product AND a good advertising plan. It won't take you long to check the possibilities of a Phillips franchise in your territory. Just write, wire, or phone

PHILLIPS PETROLEUM CO.

Bartlesville, Oklahoma

Chicago Minneapolis St. Louis
Indianapolis Des Moines Omaha
Peoria Kansas City Wichita
Tulsa Amarillo

MASTER

EXPLOSION PROOF MOTORS

- **PROTECT LIFE AND PROPERTY**—Use Master Explosion Proof Motors in presence of explosive gas or dust.
- **FOR EXPLOSIVE GASES** — One type approved by Underwriters Laboratories for Class I Group D hazardous gas locations.
- **FOR EXPLOSIVE DUSTS**—Another type approved by Underwriters Laboratories for Class II Group G hazardous dust locations.
- **FAN COOLED** for cool operation and long life.
- **GEARHEAD EXPLOSION PROOF MOTORS** available with Underwriters Laboratories approval nameplate.
- **A COMPLETE LINE**—1/8 to 75 Horsepower.

THE MASTER ELECTRIC COMPANY, DAYTON, OHIO

George F. Smith

● George F. Smith, recently elected vice-president of Continental Oil Co., has been treasurer of the company for 19 of the 31 years he has been in its employ. He joined Continental in 1907 as an accountant in the Denver offices, and served as division accountant there and later at Salt Lake City. He became assistant secretary and treasurer in 1912 and secretary and treasurer in 1919. He continued as treasurer after the merger of Continental and Marland Oil Co. in 1928.

News By Teletype From 4 News Bureaus

National Petroleum News

News From Oil Industry Everywhere

VOLUME 30 WEDNESDAY, JUNE 1, 1938 NUMBER 22

25 at Madison To Plead Nolo In Second Case

MADISON, Wis., May 31.—The stage has been set to ring down the curtain here June 2 for most of the defendants in the second oil indictment involving jobber contracts.

Twenty-five defendants, including 14 companies and 11 individuals, are scheduled to appear before Federal Judge Patrick T. Stone here Thursday and enter pleas of *nolo contendere* to the indictment. They have agreed, according to a justice department announcement at Washington last week, to enter this plea on all three counts of the indictment and to pay maximum fines totaling approximately $400,000.

The indictment will be dismissed as to other officials of the companies entering such pleas, it was said.

There are 16 other defendants in the same case—8 companies and 8 of their officials — who have decided to fight it out. These defendants will be brought to trial before Judge

(*Continued on page* 20)

Shell Curtails In East

N. P. N. News Bureau

NEW YORK, May 31. — Shell Union Oil Co. is disposing by sale and by lease of its company-owned bulk plants in western New York and central and eastern Pennsylvania, except the Philadelphia area, where it was found unprofitable to operate, it was learned today. Supply contracts with distributors in these areas will be terminated at their expiration date.

This follows similar curtailment recently by Shell Petroleum Co. of marketing operations in Nebraska, the Dakotas and several other midwestern states.

Californians Block Oil Tidelands Grab

By Teletype
N. P. N. News Bureau

WASHINGTON, June 1.—Californians who have remained in Washington for more than a week in an effort to stop the federal grab of their submerged oil lands today said they believed they could prevent consideration of the amended Nye bill on the floor of the House.

Impending adjournment of the last session of the 75th Congress, leaders today set June 15 as the "deadline" for close of the session.

Chairman O'Connor of the

(*Continued on page* 26)

Divorcement Bill is Orphaned; Daddy's Gone a'Hunting Votes

N. P. N. News Bureau

WASHINGTON, May 31.—Possibility of action on the Gillette marketing divorcement bill at this session of Congress appeared more remote today when it was learned that Sen. Pat McCarran, Nev., whose subcommittee held hearings on the bill in April, plans to leave the Capital this week for Nevada.

The Senator's plans, it was further learned, do not include a return trip to Washington until the next session begins next January.

Up until the time the senator leaves, office attaches said, he will be very busy with conference committee meetings and work on other measures on the floor, so that it is doubtful if any time can be spared for the Gillette measure.

The bill's author, Sen. Guy Gillette, Iowa, also has left Washington for his home state, where he faces bitter opposition in the primary election to be held June 18.

These facts, coupled with the belief of the majority of congressmen and their leaders that adjournment will come sometime before June 15, appear to doom the Gillette measure for this session.

Companies Set Prices Under New Jersey Law

TRENTON, N. J., June 1.—The "New Jersey Plan," boomed as the successor of the Iowa Plan with dealers setting retail gasoline prices, was born in this state today.

Although only a few hours old the plan gave promise of straightening out New Jersey retail markets which have been notoriously unsettled for several years, according to dealer association leaders.

Three major company suppliers—Standard of New Jersey, Shell-Union Oil Co., and Continental Oil Co.—today put into effect contracts with their dealers specifying minimum retail prices for their respective branded gasolines.

This action, taken under the New Jersey law permitting such resale price maintenance contracts, was coupled with the new price-posting law—also effective today—as being responsible for generally improved retail markets throughout the state.

Other major company suppliers, most of whom met tank wagon price reductions by companies specifying resale prices, indicated that they would await developments before deciding whether they, too, would make use of the New Jersey fair trade law.

"Ninety-nine out of every hundred dealers in the state are posting a minimum price of 15.3 cents for regular gasoline," said J. M. McCloskey, president of the New Jersey Gasoline Retailers Assn. today. "Unbranded gasoline was generally at 13.8 cents."

Minimum retail prices specified in dealer contracts of Standard, Shell-Union and Continental were 15.3 cents including taxes for their regular branded gasolines.

Dealers to Police Outlets

Asked if he thought that unbranded gasolines might prove a stumbling block in the path of the "New Jersey Plan", McCloskey told NATIONAL PETROLEUM NEWS that the association intended to police all retail outlets, including unbranded dealers.

Where an unbranded dealer is found selling at more than 1.5 cents below prices for "regular", it is planned to cite him to the motor fuel tax commissioner for possible prosecution under the new below-cost-selling law, McCloskey said.

The dealers' association meeting here today was expected to decide whether suits to enforce

Crude Situation Hits Even Keel

By Teletype
N. P. N. News Bureau

TULSA, June 1.—Feeling is pronounced in this part of the oil country that the turn has definitely been made from the dangerous situation of a few weeks back and that firmness now prevails in the crude oil market on the basis of present allowables.

A few conditions remain to be corrected but they are more and more becoming localized and not reflective of a general tendency. Pipeline proration has waned and it is felt that over June at least there will be no extension of this practice.

Early in May it looked as thought this form of reducing production would become general. It is a certain method of keeping production to the level desired by the purchasers; its evil is that it destroys ratable production among operators in the same field.

The Kansas Corporation Commission retained the May average of 160,000 barrels in its order for June. Details of distribution of this amount had not been settled as the month began. The chief point on which the commission was still working was the amount of allowable to be apportioned to the big accumulated underproduction which was caused by

(*Continued on page* 30)

specified minimum prices would be brought by individual dealers or by the association.

None of the supplying companies so far have specified resale prices in their jobber contracts. However, even though no resale contracts, either on tank wagon or retail prices, have been entered into with jobbers, it was pointed out that the jobber's retail outlets are bound to respect the minimum prices on branded gasolines specified by the supplying company.

One feature of resale price maintenance contracts under state fair trade laws, like in New Jersey, is that it is not necessary to contract with *all* retailers handling a certain branded product. It is sufficient if all retailers have been advised of the minimum price specified in contracts with other dealers. Then all retailers handling that brand are bound by that price.

Oil marketers east of California (where similar contracts have been in effect for some months) are interestedly watching operation of the "New Jersey Plan." How the plan succeeds in New Jersey may determine whether or not it displaces the Iowa Plan or Dealer Marketing Plan in other states.

The New Jersey company's formal announcement made public May 26 revealed that dealers supplying its branded products would be allowed minimum margins of 3.7 cents, 3.2 cents, and 2.4 cents on "Esso" (Premium), "Essolene" (regular) and "Standard White" (third grade) respectively.

Under the terms of the contract under the fair trade act, dealers may not sell the company's branded products at less than 17.3 cents, 15.3 cents and 14.3 cents per gallon, respectively.

Prices of these grades of gasoline to the undivided dealer, effective June 1, will be 13.6 cents, 12.1 cents and 11.9 cents, respectively, resulting in the above mentioned minimum margins. By selling branded products at over the minimum price stipulated the dealer can increase his gross profit margin.

In announcing its policy, the New Jersey Standard stated:

"It is recognized that the above minimum retail price is subnormal and the contract that the Standard Oil Co. of New Jersey is offering its dealers provides that the company shares 50-50 with its dealers the burden of such subnormal conditions."

Explaining the feature of its contract with dealers whereby the company shares the burden of low prices with its dealers, a company official stated that in the future all margins and prices will be figured from the recognized "normal" market in the state.

"Normal" Price Is 16.9c

He said that the "normal" service station price in New Jersey is 16.9 cents for regular gasoline, including taxes. The "normal" price to dealers is 12.9 cents per gallon.

Standard's minimum price for regular effective June 1 of 15.3 cents per gallon therefore is 1.6 cents below the recognized "normal" price.

Under the company's new policy, all reductions below the recognized "normal" price are to be shared equally with its dealers. The starting price of 12.1 cents per gallon for regular gasoline to undivided dealers carries out this feature—the 12.1 cent price being 0.8-cent below the recognized "normal" to dealers, or one-half the amount by which the service station price is subnormal.

The Jersey company's dealer contract does not contain, it was explained here, a minimum stop, or a guarantee of a minimum margin to dealers. The dealer will continue to split with the company all reductions under the "normal" price, regardless of how it affects his gross margin.

Under the company's contract, the dealers will be assured, at least while present prices hold, of margins which are far in excess of those enjoyed by New Jersey dealers the past year, it was pointed out.

Narrow Margins

The company's announcement stated "that the New Jersey gasoline market for the past year has gone through a series of abnormal prices which have not only brought about subnormal tank wagon prices, but also left the retailers in many cases with a profit margin on which they can hardly exist."

Prior to June 1 the tank wagon price to dealers was 12.25 cents on regular grade, including taxes, throughout the state. Service station prices in some areas have been as low as 12.9 cents including taxes, leaving gross dealer margins as low as 0.65 cent per gallon.

* * *

California Dealers Bear Brunt Of Enforcing Resale Price Law

By Telegraph
N. P. N. News Bureau

LOS ANGELES, June 1. — California gasoline retailers today had their telescopes trained on their brethren across the continent in New Jersey who are undergoing their first experience of supplying companies designating minimum retail prices on branded gasolines.

While wishing success to their fellow dealers in New Jersey, the California retailers have found that resale price contracts have not been particularly effective on the West Coast in stabilizing retail gasoline markets.

It is estimated that approximately 85 per cent of all gasoline sold at retail here is covered by resale price contracts calling for adherence to prices nominated by the suppliers, including all major oil companies and most Independents.

Unlike liquor, drugs and other trades, no direct legal action has been taken by the supplying oil companies to enforce price provisions in their dealer contracts against price-cutters.

Under-the-canopy cutting of prices in California has increased in recent months in the face of lower prices and wider margins on so-called Independent brands.

But, except for pointing to the fair trade law and its protection of prices on branded products, supplying oil companies have not used this law as a weapon in defense of their nominated retail prices.

In a recent suit, brought by the Retail Petroleum Dealers Assn. to enjoin a group of dealers accused of cutting prices on branded gasolines, the court remarked that the suppliers didn't seem much interested in maintaining their nominated prices.

In reply, it was suggested that if any supplier should take action against a price-cutting dealer he would lose the account to an Independent supplier not specifying a retail price. Until 100 per cent of the retail gasoline gallonage is covered by resale price contracts, suppliers cannot take the lead in enforcing such contracts, it was said.

Fate of the California fair trade law as an instrument in stabilizing retail gasoline markets is expected to be determined by outcome of a blanket suit, now in court filed by the R.P.D.A. against a number of dealers accused of price-cutting on branded gasolines.

Oil Exports Up 20% Over 1937

N. P. N. News Bureau

WASHINGTON, May 31.—United States exports of petroleum and its products in April were valued at $35,757,000, compared with April exports last year of $29,671,000, a gain of a little more than 20 per cent, Bureau of Foreign and Domestic Commerce reports.

This brings exports for the first four months of 1938 up to a value of $126,817,000, an increase of about 25 per cent over the same period of 1937, when exports were valued at $101,814,000.

April crude exports jumped from 4,899,000 barrels last April, valued at $7,234,000, to 7,553,000 barrels in April this year, valued at $11,097,000, the Bureau's figures show.

Chief recipients of U. S. crude in April were Japan, with 2,948,388 barrels; Canada, with 1,676,154 barrels, and France, with 1,573,528 barrels. Japan's April takings of American crude were more than double those of April, 1937, when she imported 1,193,068 barrels from this country. France's imports of U. S. crude also showed a big increase—from 685,852 barrels last April to 1,573,528 barrels this year.

Gasoline exports this past April amounted to 3,720,000 barrels, valued at $9,731,000, compared with 2,126,000 barrels, valued at $5,372,000 in April a year ago.

Sizable increases in takings of U. S. gasoline were shown by figures for Netherlands, Netherland West Indies, France, United Kingdom, and Australia. A comparison of April gasoline exports in barrels to these countries follows:

	1937	1938
France	79,493	417,569
United Kingdom	273,783	782,267
Netherlands	150,008	232,268
Neth. West Indies	220,273	342,434
Australia	168,417	178,606

Exports of gas oil and distillate fuel oil also accounted for a share of the increase, although shipments to a number of countries fell off somewhat in April. Total April exports were 2,552,375 barrels, valued at $3,847,833, compared with 2,403,330 barrels, valued at $3,467,484 in April last year.

Increases were shown in shipments to Germany (212,883 barrels last April to 406,750 barrels this year); United Kingdom (124,596 to 305,069 barrels), and Netherland West Indies (206,613 to 456,900 barrels).

Tax Bill To Help Business Becomes Law as FDR Frowns

N. P. N. News Bureau

WASHINGTON, May 31.—Irked because Congress all but eliminated the New Deal's undistributed profits and capital gains taxes from the nation's revenue law, President Roosevelt last week allowed the bill to become law without benefit of his signature.

Striking of these widely criticized levies from the tax picture was hailed by business over the entire country, but the chief executive denounced the bill from which they had been carved. There were, he said, desirable features in the bill which he didn't want to lose, so he allowed it to become law, but took the opportunity presented by a commencement address to 13 high school graduates in West Virginia to point out what he thought was wrong with it.

Especially important to small corporations, and there are many such in the oil industry, was the virtual expulsion from the bill of the undistributed profits tax. Under the tax law which this new one will replace, corporations were heavily penalized for "plowing back" their profits into the business.

Under the new law, there still is a penalty, but it amounts to only 2.5 per cent of profits which are not distributed as dividends.

The new law also exempts from the undistributed profits tax altogether those corporations whose annual earnings are below $25,000. (NPN, April 27, p. 18).

The lightening of the tax burden on these small corporations (which will now pay a flat income tax rate on the first $5,000 of their earnings; 14 per cent on the next $15,000, and 16 per cent on the next $5,000), the President listed as one of the "good features" of the tax bill.

But the slashing of the penalty on larger corporations, he said, makes it "so small . . . that it is doubtful whether it will wholly eliminate the old tax avoidance practices of the past." These practices the President attributed largely to so-called "closely held" corporations, whose handfuls of stockholders let the profits accumulate without declaring dividends, thereby "cheating" the federal government of both personal and corporation income tax collections, he said.

The new tax bill also eliminates the so-called "Ickes taxes" on production and refining of crude oil and natural gasoline, which netted the federal treasury only a little more than $950,000 last year.

During the somewhat erratic journey of the new tax law through Congress, attempts were made to saddle on it the Boland fuel-oil tax — one cent a gallon on fuel oil used for heat and power — but this proposal, along with several others, never got very far along, although it may have been corralled some votes for its sponsors in the coal regions of Pennsylvania.

Although in messages to Congress before the tax bill was taken up by the Ways and Means committee both President Roosevelt and Secretary Morgenthau denounced as a "loophole" the depletion allowance granted oil and mining companies in computing taxable income, no action was ever taken to incorporate into the new law any provision for slashing or eliminating this allowance.

However, the Ways and Means committee is expected to reopen the whole thing at the next session, and attempts to get the New Deal tax policies further embraced by the revenue laws are certain. In his high-school graduation speech, which was broadcast to the nation, the President heralded this future attempt with his declaration:

"In accordance with recommendations made during several past years, I hope that the Congress will undertake a broader program of improving the federal tax system as a whole in the light of accepted principles of fairness in American taxation and of the necessary incentives in our economic life."

Doubtless this broad statement will be translated into another tax message to the next session of Congress.

Federal 'Gas' Tax Collections Are Running 8% Ahead Of 1937

N. P. N. News Bureau

WASHINGTON, May 31.—Federal gasoline tax collections in April were 20 per cent above those in April, 1937, Internal Revenue Bureau reports.

The large increase—from $13,591,592.84 in 1937 to $16,436,553.87 in April this year—is probably more reflective of reporting methods than increased consumption, however, it was said at the revenue bureau, which pointed out that February's gasoline tax collections were considerably below those for February a year ago, although the general trend has been upward.

Over the four-month period ended with April, collections totaling $60,728,420 were about 8 per cent above those in the corresponding period of 1937 which amounted to $56,181,046.

Internal revenue officials pointed out that comparisons of periods of several months were more accurate than month-to-month comparisons.

Delay on the part of one large refiner, or of one collection district, in getting its collection report to the bureau here, it was said, sometimes throws the figures for a single month off quite considerably, when compared with the figures for the same month a year previously.

Such a delay would make the figures for the immediate past month appear low by comparison, but at the same time, it would boost the figures for the subsequent month so that they would be comparatively high.

If the 8 per cent trend noted in collections over the four-month period is maintained, gasoline taxes for 1938 will be above $220,000,000 compared with a little more than $203,000,000 in 1937.

A decline is shown in collections from the federal lubricating oil tax during the first one-third of the year, however—from $9,926,920 during the January-April period last year to $6,259,679.98 this year. At least a portion of this decline, however, probably is traceable to delay in reporting, or other mechanical processes.

The tax on pipeline transportation during the first four months this year netted the federal government $4,207,878.03, compared with $3,923,708.67 in the same period of 1937—a gain of a little more than 7 per cent.

The so-called "Ickes Taxes" on production, refining and gasoline produced from natural gas, which will pass out of existence June 30, brought in $327,644.06 during the four-month period, compared with $298,337.37 last year.

In all, the four direct federal taxes on the oil industry accounted for revenue of $71,523,602.67 in the first one-third of 1938, compared with $70,330,012.89 in the same period last year.

Mexican Offer Of Oil Payment Studied By U. S.

N. P. N. News Bureau

WASHINGTON, May 31.—State Department officials are "still studying" the proposals submitted on behalf of the Mexican government last week for payment for the oil properties which that government expropriated from their American owners late in March.

While the proposals have not been made public, it is understood they involve an arrangement of selling oil to the firms whose properties were confiscated at a price fixed at a percentage below the market price over a period of years.

This would provide a method of paying gradually on account for the seized properties. The plan is said to be extremely complicated.

Three representatives of the firms whose properties were taken over conferred at the State Department today, but afterward it was described as another "informal conference" discussing various phases of the situation, but not taking up the problem as a whole.

It is understood the Mexican proposals have not yet been submitted to the affected oil companies, and will not be until the State Department completes its study of them.

Government Insurance For Trucks Urged

N. P. N. News Bureau

WASHINGTON, May 31.—A bill to create a self-supporting governmental insurance agency to furnish "insurance of all kinds to motor truck operators when such insurance cannot be procured from private companies at reasonable rates" has been introduced by Rep. E. C. Eicher, Iowa.

American Trucking Associations, Inc., hailed the bill as a blow at "monopolistic insurance companies," and said its introduction "comes at a time when motor carrier representatives are urging Congress for prompt relief" from practices of such companies.

The Government corporation also would be authorized to reinsure motor carriers who previously had been covered by private companies at "unreasonable" rates.

Nolo Contendere Pleas For 25 To Be Entered in Madison Case

(*Continued from page* 17)

Stone here on Sept. 26, the justice department said.

The department said that the offers to enter *nolo* pleas were agreeable, if acceptable to Judge Stone.

The department's announcement climaxed lengthy negotiations between anti-trust division attorneys and members of defense counsel. Two weeks ago, a conference was held here before Judge Stone between Col. William J. Donovan, representing a number of defendant companies, and Hammond E. Chaffetz and John H. Lewin, justice department attorneys.

In its statement explaining why it had taken this action, the justice department said that the pleas amounted "virtually to pleas of guilty," pointing out that a responsible executive of each of the companies had "evidenced responsibility for the activities of his company" by his agreeing to enter a *nolo* plea.

The department differentiated between the second oil case and the indictment on which 46 defendants were convicted here Jan. 22 of a conspiracy to raise tank car gasoline prices through a so-called buying program. The same grand jury returned both oil indictments. The department also took occasion to deny statements that the oil companies were convicted for following policies sanctioned under the NIRA.

The indictment, charging a conspiracy to fix margins and other provisions in jobber contracts through secret meetings dating back to 1931, was originally returned Nov. 6, 1936, by the federal grand jury here which conducted an investigation of oil marketing in the Middle West. Later, when the indictment was attacked because of a "flaw" in drawing of the grand jury, a similar indictment was returned by a new grand jury on Dec. 22, 1936.

The grand jury investigation here, which opened May 4, 1936, followed an extensive inquiry by the justice department's G-men. Complaints had been previously filed by the National Oil Marketers Assn. requesting that the justice department investigate the major oil companies to see if there were any violations of anti-trust laws.

The names of the defendant companies and their executives who have offered to enter pleas of *nolo contendere* and pay fines, according to the justice department, are as follows:

Socony-Vacuum Oil Co., Inc., Charles E. Arnott, vice-president (formerly president), New York City; Wadhams Oil Co., A. G. Maguire, chairman of the board of directors, Milwaukee, Wis.; Standard Oil Co. (Indiana), Amos Ball, general sales manager, Chicago; Cities Service Co., Cities Service Oil Co., Empire Oil & Refining Co., Harry D. Frueauff, vice-president, Tulsa; Continental Oil Co., Edward Karstedt, formerly vice-president, Denver; Pure Oil Co., G. C. Morris, sales manager, Chicago; Shell Petroleum Corp., Alexander Fraser, president, St. Louis; Sinclair Refining Co., J. W. Carnes, vice-president, New York City; Mid-Continent Petroleum Corp., Robert W. McDowell, vice-president in charge of sales, Tulsa; Phillips Petroleum Co., Frank Phillips, president, Bartlesville, Okla.; The Ohio Oil Co.; Skelly Oil Co., W. G. Skelly, president, Tulsa.

The names of the indicted companies and their executives whom the government proposes to bring to trial on Sept. 26th, the announcement said, are as follows:

Gulf Refining Co., William V. Hartmann, vice-president, Pittsburgh; The Texas Co., W. S. S. Rodgers, president, New York City; H. W. Dodge, vice-president in charge of sales, New York City; S. B. Wright, territorial manager, Chicago; Tidewater Associated Oil Co., Edward L. Shea, executive vice-president, New York City; J. W. Warner, assistant vice-president in charge of sales, Tulsa; Barnsdall Refining Corp., Edward B. Reeser, president, Tulsa; The Globe Oil & Refining Co. (Okla.); The Globe Oil & Refining Co. (Ill.); The Globe Oil & Refining Co. (Kans.), I. A. O'Shaughnessy, president, Minneapolis; The National Refining Co.

* * *

Justice Department Statement

U. S. vs. Socony-Vacuum Oil Co., Inc., et al

"The above entitled case is one of two prosecutions pending in connection with the oil industry in the Mid-Western states. The other prosecution (*United States v. Standard Oil Company (Ind.) et al*) has already been tried and resulted in the conviction of 46 defendants, on whom sentences have not as yet been imposed. The court has under consideration motions for new trials. This statement in no way affects the latter case, although it is part of the same general picture.

"In the case under consideration (*United States v. Socony-Vacuum Oil Co., Inc., et al*) 14 of the defendant companies and 11 of the defendant executives have offered to enter pleas of *nolo contendere* and to pay maximum fines and costs totaling approximately $400,000 on all three counts of the indictment. In view of the nature of these pleas, amounting virtually to pleas of guilty, this proposal has been accepted by the department and has been recommended to the court. A responsible executive of each of those companies has evidenced his responsibility for the activities of his company by pleading *nolo contendere*. We feel that these pleas result in the conviction of those who have been primarily responsible for the activities which gave rise to violation of the anti-trust laws by those companies. Therefore the government, with the approval of the court, will dismiss this indictment as to the other indicted officials connected with these companies.

"Eight of the companies indicted, including their officials, have not joined in this proposal or offered to plead *nolo contendere*. As against them, the indictment will be vigorously prosecuted.

The Grounds for the Action Taken by the Department

"1. *Conditions in the industry which tend to create monopoly control.* This present case is the second of the criminal cases brought at Madison, Wisconsin, dealing with practices of the dominant group of major oil companies in the Mid-Western area. The first case has been tried and has resulted in convictions of 46 defendants who have not as yet been sentenced. The indictment in that case was brought to present to an impartial judicial tribunal evidence collected by this department tending to show the fixing and maintaining of prices, both wholesale and retail, of gasoline throughout the Mid-Western area. The case now under discussion presents another aspect of a single picture. It was brought to present the evidence which the department had of a series of unlawful agreements entered into by the major oil companies beginning in the spring of 1931 and continuing at least until December 22, 1936, the date of the indictment, whereby the maximum margins of gross profits for gasoline jobbers, the jobber contract, and other practices relating to jobbers were fixed and made uniform. Thus, by the practices attacked in the first case, the major oil companies by concerted action were engaged in raising the prices at which they marketed their gasoline. By the activities attacked in the second indictment these companies and others were, at the same time, by concerted action preventing the large class of jobbers from enjoying the benefits of free competition. Both activities clearly violated the Sherman anti-trust act as it has been construed by the courts.

"2. *Procedural action taken in this case and the grounds therefore.* A criminal prosecution was originally brought. It is the policy of this department, unless there are compelling reasons to the contrary, to bring criminal actions rather than suits for injunction where defendants have committed acts which constitute violations of the criminal provisions of the anti-trust laws. The department should not take the responsibility of declining to present evidence in a criminal prosecution where it has that evidence in its possession. In general, there can be few reasons for failing to present to the court such evidence of criminal action. The existence of acquiescence on the part of the government over long periods in the past which may make the institution of a criminal prosecution inequitable or its success impossible might be one of those reasons. In these cases, however, there was no acquiescence by governmental authority in the activities complained of.

"Much confusion, however, has been created by statements that the oil companies were following policies which had received the sanction of government departments under the N.R.A. This is not the fact. The practices for which the defendants in the first oil case were convicted never received government authority under the NRA, or otherwise, and the court and jury so found. The same is true of the practices with respect to jobbers for which the defendants were indicted in the present case. Furthermore, these jobber practices began as early as 1931, long prior to the NRA, and con-

tinued long after the NRA was declared unconstitutional.

"The Department of Justice is responsible for the enforcement of the anti-trust laws. It would be neglecting its duty if it did not enforce the law as written and interpreted by the courts. As above stated, the NRA even when regarded as valid, gave no sanction to the activities attacked in either of these cases. These activities did not fall under the exemptions from the anti-trust laws which the NRA purported to grant. It may be further noted that, despite the efforts of the government in its defense, the NRA was declared unconstitutional. To base a prosecution policy on claims of exemption from the anti-trust laws granted by the NRA after it had been declared unconstitutional would amount to continuing to give effect to that unconstitutional statute rather than to the valid anti-trust laws, and in that way run counter to the declared will of Congress.

"3. *The economic results which are to be expected from the action taken by the government in this case.* The offer now made by certain of the defendants to enter pleas of *nolo contendere* and pay fines and costs may be regarded as a complete capitulation on their part. The conviction of the 46 defendants in the first case, taken together with the fact that a responsible executive of each of the companies joining in the proposal in the present case assumes, by pleading *nolo contendere*, responsibility for the illegal activities of his company, should achieve, as against them, substantially the purpose for which the prosecutions were instituted.

"The case is important because it tends to preserve competition where it still exists. Too often during the past 40 years anti-trust proceedings have been brought 10 years too late, when competition has already been destroyed, and it has become impossible to recreate it by a criminal conviction or a court decree. It will, therefore, be the policy of this department to watch carefully evidences of combinations in situations where no competing organizations exist to fill the gaps. It is important to announce this policy to clear up the misunderstanding which may arise from the fact that the department is acting in areas which are admittedly competitive to some extent at the time the proceeding is brought."

Thurman Arnold,
Assistant Attorney General.
Approved:
Homer Cummings,
Attorney General.

Oil Burner Shipments Show Upturn

N. P. N. News Bureau

WASHINGTON, May 31.—Shipments of distillate oil burners showed a marked upturn in April, but burners shipped of the types burning No. 1 oil or heavier, used for application to central heating plants, showed a slight decline, figures of the Census Bureau show.

April shipments of distillate burners (used in ranges, stoves, water-heaters and space-heaters) numbered 12,722, compared with 7,652 in March, 24,068 in April last year, and 7,398 in April 1936.

The number of the other type of oil burners shipped in April was 7,318, compared with 7,867 in March.

For both types, four-month shipments in 1938 were considerably below the same period of last year.

Nine Added To Kansas Marketers' Board

WICHITA, Kans., May 31.—Nine additional directors of the Kansas Oil Men's Assn. have been appointed by President E. M. Taylor, in order to have better representation throughout the state. The new directors are:

Walter Glidden, Glidden Oil Co., Clay Center; Fred Kistler, Kistler Oil Co., Coffeyville; H. L. Funk, Funk Oil Co., White City; B. H. Dinkins, Fowler Equity Exchange, Fowler; D. L. Anderson, Anderson Oil Co., Burr Oak; J. A. Bowles, Atwood Farmers Oil Co., Atwood; Harry Lightcap, Lightcap Oil Co., Hugoton; A. E. Smith, Smith Oil Co., Tribune, and T. R. Garrett, Universal Motor Oils, Wichita.

Dave L. Hubbell has been appointed field man for the association and will spend his entire time in the field.

Build Gathering Line

TULSA, May 31.—Construction of approximately 80 miles of gathering lines has been started by the Continental Oil Co. in the KMA field of north Texas, to supply gas for its gasoline plants now under construction.

The main plant will have a capacity of approximately 15,000,000 cubic feet of gas daily and is located on the company's Waggoner lease. Repressuring units also will be installed so the processed gas can be used for gas-lift purposes.

High Court to Decide Fate Of Pennsylvania Oil Probe

By Telegraph

HARRISBURG, Pa., May 31.—The Pennsylvania Supreme Court has before it for final determination an appeal from a decision of the Dauphin county court halting the legislative inquiry into the oil industry.

Argument was heard by the supreme court at its annual sitting in Harrisburg last week. Sessions of the court have virtually been concluded for this term except for a one-day meeting in Philadelphia, June 17.

After that the court will recess until September. Unless the court rules on the oil inquiry by June 17, a final decision is not expected until fall.

Governor Earle directed his attorney general to take an appeal to the Supreme Court immediately after the Dauphin county court put a stop to the inquiry. Final argument was presented when the court held its annual session in Harrisburg.

The case reached the courts when George W. Scudder, Glenside, asked the Dauphin county court for a test on the validity of the 1937 legislation creating the commission. In disposing of the case the Dauphin county court held the act creating the commission invalid because it represented an unlawful delegation of legislative power. An appropriation of $50,000 was provided for the investigation and a tax of $1 on each gasoline pump was imposed to raise the money.

The investigation was called a "fishing expedition," by former Attorney General Wm. A. Schnader who argued the case for the plaintiff.

"The Governor," Schnader said, "could throw in the waste basket everything the commission sends to him and he would be violating neither the spirit nor letter of this joint resolution."

Schnader called attention to the court that the U. S. Supreme Court recently ruled that the petroleum industry was not affected by public interest sufficiently to warrant government regulations. He also declared that the state constitution prohibits the appropriation of money by a joint resolution such as was passed last year in creating the commission to investigate the oil industry in Pennsylvania.

Action of the legislature in setting up the oil investigating body was defended as being necessary in the public welfare.

A.A.A. and AAA Confusion May Be Ended By Congress

N. P. N. News Bureau

WASHINGTON, May 31.—Senator E. D. (Cotton Ed) Smith, S. C., has introduced a bill which would put a stop to those letters American Automobile Association has been getting for five years seeking advice on the best way to kill little pigs or plant sorghum.

By the same token, it would stop Agricultural Adjustment Administration's influx of letters asking the best road to Keokuk, Devil's Lake or Tallahassee, and phone calls from stalled motorists.

For five years of the New Deal this strange mix-up in mail, telephone calls and all other communications has gone on—because the initials of both the government agency and the motoring association are both triple A.

Smith's bill would authorize the Secretary of Agriculture to "select and make public a new name for the agency in the Department of Agriculture now known as the Agricultural Adjustment Administration."

Of course, the bill doesn't say that the initials shall not be "AAA", but chances are against a double repetition of the first letter of the alphabet, especially since it was introduced to bring the confusion to an end.

Naturally, the American Automobile Association (which has used A.A.A. for 36 years), is right hopeful of passage of Smith's bill. They're still a little jumpy when a telephone rings, remembering all the explaining they had to do when the Supreme Court knocked out a part of the agriculture program, and newspaper headlines announced "A. A. A. Held Unconstitutional."

National Petroleum News

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Published every Wednesday by The National Petroleum Publishing Co.

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V. B. Guthrie, *Managing Editor*

FOUNDED 1909
Member of Audit Bureau of Circulation and Associated Business Papers, Inc.

Publication office: 1213 W. Third Street, Cleveland, O.
Telephone, CHerry 7672 Cable Address, Plattoil, Cleveland

NEWS BUREAUS

New York, 50 W. 50th Street, Telephone, COlumbus 5-1516 and 5-1517.
Chicago, Buckingham Bldg., 59 E. Van Buren Street, Telephone, Harrison 5901-2-3.
Washington, D. C., 1002 National Press Bldg., Telephone, NAtional 0654.
Tulsa, Okla., 904 World Bldg., Telephone, 3-7132.
Los Angeles, 610-A Hillstreet Bldg., 815 South Hill Street, Telephone, VAndike 2845.

Subscription rate $3 per year in United States and Mexico; $4 in Canada; $4.50 Foreign Countries. Current copies 10 cents, except special issues; back copies more than two months old 20 cents per copy.

One Plank in a Platform For a Sounder Oil Industry

Broader tank car markets.

More refiners, including majors, selling in those markets and more jobbers buying in them also.

Both buyers and sellers **Daily** making completed sales for prompt shipment of unbranded products.

States vs. U.S. for Oil Control Increases Industry's Problems

By WARREN C. PLATT, Editor

The struggle between the oil states and the federal government as to who will control the oil industry has been made more acute by the effort of the Roosevelt administration to get a law seizing the oil under the tidal lands of California.

The plan originally was to seize all tidelands but the state of Texas put up such a protest that the fight was narrowed to the tidelands of California, probably because many of the oil rights there have already been leased to major companies and a battle with a major oil company seems to be always welcomed by this administration.

The struggle should be watched in connection with the efforts of the oil states to devise and enforce conservation laws that will prevent crude oil from being wastefully produced, which waste would knock down the price to a losing figure.

And in the same connection should be borne in mind all the other regulatory legislation that has been proposed at Washington and in state legislatures against the oil industry.

One can little wonder that the Roosevelt administration seems to view with some calmness Mexico's recent seizure of oil properties of American and English companies, when further governmental control of our oil industry is so prominently in its mind.

California's Governor Merriam said, in protesting the proposed action of a Congressional committee against his state's tidelands; "Some other motive exists behind this attempt . . . . and many impute a design to socialize all oil deposits."

It seems that oil is getting more government tangled up in its affairs than most any other industry save public utilities.

The important thing for the safety of the industry and the country, is for each oil man to be fully advised and to understand the whyfors and the implications of all these encroachments and plans for socialization, so that he may have grounds upon which to make a careful and considerate determination of what position he takes on each point as it comes up. At present one fears too many oil men are being swayed by incomplete and inaccurate information and a failure to give the subject the thought it requires.

Believing that the relationship between the oil industry and state and federal government grows increasingly important and more critical, NATIONAL PETROLEUM NEWS and THE OILGRAM starting with the days of the oil code in the summer of 1933, established a greatly enlarged News Bureau at Washington to give the industry accurate and complete daily and weekly information on this ever growing problem. The reports from our Washington bureau are facts without any coloring or bias, so that the men in the industry can make up their own minds as to what is good and what is bad.

These NPN reports should be studied by the thoughtful oil man along with the rest of the news from Washington because, whether we like it or not, the industry's biggest problem today and for years to come is its relationship with government.

It is not to be expected that all oil men will think alike on all matters that arise in connection with government but the big point is that they all should think after having studied all the facts—not just jump to a conclusion because at the moment some proposed law or act might seem to give a personal advantage.

Things done by government are not like the monthly or yearly contracts between private persons; what Washington and state governments do is pretty much for all time, at least as to general direction. The private oil man cannot revoke a governmental action the minute he finds it was a mistake and does not work out the way he expected.

"Jersey Co." Tries "Big Experiment"

The Standard Oil Co. of New Jersey announces it is going to try posting and maintaining its own resale prices in New Jersey, in conformance with that state's price maintenance law. Continental Oil and Shell Union say they will try the same plan. It will be an interesting experiment to watch As to its success we have our fingers crossed. We cannot call the trial in California the past few months exactly a success.

New Jersey is about as highly competitive as any territory in the country. Many companies of varying costs supply it, by tankers, barges, trucks and pipelines. Dealers are numerous and of all nationalities. Price cutting has been the usual thing there for years.

If the Standard sets its prices for resale high enough so everybody is happy then the chances are the competition's happiness will flow from the Standard's prices being so high they can sell under it and take the business. If the Standard's prices are low enough to hold its present volume or to increase it, then the chances are the competition will protest that it cannot live under such prices.

However, the proposition might just as well be tried out and we admire the courage of these oil companies in tackling it. At all events the rest of the industry can be assured the experiment will be thoroughly tried out. Either way the result goes, the industry will be better off for having the scheme actually put to work.

Divorcement Bill Is Opposed By O.P.M.A.Board

N. P. N. News Bureau

CLEVELAND, May 28.—The proposed legislation now before Congress in the form of the Gillette and Biermann bills, to divorce marketing from other branches of the oil industry, is opposed in positive terms by the board of directors of the Ohio Petroleum Marketers Assn.

The May bulletin of the association, in commenting on the directors' action, stated that many oil marketers in Ohio who had previously favored the divorcement plan, upon receiving information from the association directors on the possible effect of the legislation, were now supporting the board in its opposition to the bills. Said the bulletin:

"Inquiries developed the fact that a very large number of marketers who were inclined to favor the legislation had not even read the bill and actually were not acquainted with its contents. A large number were under the impression that the bill specifically required each branch of the industry to stand upon its own financial feet."

Considerations which prompted the Ohio marketers' board to oppose the divorcement bills were as follows, as given in the bulletin:

"That the enactment of such a law would bring about general demoralization of the market and usher in the fiercest type of competitive and evil practices—a dog-eat-dog era.

"That, under such conditions, jobber and dealer margins would sink to the lowest depths, and the consequent failure of many small operators deserving of their right to remain in business.

"That such a law, admitted by its proponents, would be a step toward further governmental regulation of the industry. The next move, it was anticipated, would be to bring about the divorcement of wholesaling and retailing, already demanded by certain groups.

"That the law immediately would give certain types of operation an unfair and unequal advantage over others.

"That the interests of the consuming public would not be benefited by such legislation but would probably be injured by it.

"That such a law likely would result in the reduction of wages and add large additional numbers to the unemployment rolls.

"That the proposed law is regarded as unconstitutional by many learned authorities.

"That the problems of the industry cannot be solved by legislative enactments but rather by the co-operative effort of the industry itself."

Syphilis Bill Signed

N. P. N. News Bureau

WASHINGTON, May 31.—President Roosevelt has approved the La Follette-Bulwinkle bill authorizing $15,000,000 for the next three years for federal-aid to the States in fighting syphilis and other venereal diseases. Under the measure, $3,000,000 is authorized for the first year's work, beginning July 1. (N.P.N., April 6, p. 17)

Iowa Jobbers To Seek Repeal Of Kerosine Inspection Law

MANCHESTER, Iowa, May 31. — The Iowa Independent Oil Jobbers' Assn. has started a campaign for elimination of the kerosine inspection law.

The association contends the law is obsolete as gasoline has long since passed out of the classification of a by-product, as it was in the days when the law was enacted to prevent gasoline from being put in kerosine to increase the supply of kerosine.

Iowa's law rejects kerosine for illuminating oil purposes with an open-cup flash under 101 degrees. The fee is 3 cents a barrel. Annual collections are about $25,000.

The association is also taking a stand, A. C. Gienapp, secretary, reports, against further increases in the gasoline tax rate, diversion of gasoline tax funds, and for a 50 per cent reduction in the pump line inspection fee.

The pump line fee of $3 a year is for inspection of each line to a gasoline pump, to check on whether the pump's measurements are accurate.

The association contends that with the increased number of service stations and third grade gasoline adding another pump, the state is making a profit on this inspection and that the fee should be reduced to $1.50 a year. Revenue from this inspection is about $55,000 a year.

"Marketing Divorcement"

The accompanying editorial commenting on the action of the directors of the Ohio Petroleum Marketers Assn. in opposing the bills now before Congress to divorce marketing from other branches of the oil industry was published in the May issue of the Ohio Petroleum Marketer, the official bulletin of the association.

"In taking a bold position of opposition to the proposed marketing divorcement legislation in Congress, the Board of Directors of the Ohio Petroleum Marketers Association was motivated by what it considered best for the interests of the independent jobbers in Ohio as a whole and particularly of that substantial group represented in the membership of the Association.

"In its usual characteristic fashion when dealing with important issues, the Board made an exhaustive study of the proposed legislation, going deeply into the reasonably probable effects upon independent marketers. Arguments for and against the divorcement measure were considered carefully. The Board, as it declared in a formal statement, was unable 'to discover one sound economic reason or one convincing argument that would lead us to believe that an emergency or necessity exists for this type of legislation.'

"Business prosperity and reforms seldom are achieved through recourse to legislation and politicians. The idea of running to government for remedies for economic ills too often proves fallacious, of which fact there have been ample demonstrations in recent years. Frequently such remedies prove worse than the disease.

"The petroleum industry has its economic ills the same as most other businesses. Overcoming of these ills depends largely upon the character and intelligence of the people who make up an industry and their willingness to cooperate for the common good. The law of economics constantly is at work and it brooks no interference from selfish interests or legislative reformers. In time a level will be reached.

"One thing that the petroleum industry can do that will be effective in solving many of its problems is to inaugurate a far-reaching campaign of education, extending to both the consuming public and all of those who derive a livelihood from the industry.

"The need of a far-reaching educational endeavor was stressed recently in an address by President Weber of the OPMA when he urged a better understanding of economic principles. 'Due to this lack of understanding, engendered by misunderstanding and mistrust,' he said, 'we today witness as never before the unfortunate spectacle of oil men appealing to Congress and state legislatures for assistance.'

"Such an educational effort is not impossible. The entire industry would be benefited by it, and so would the public."

Radio Proclaims Clean Restrooms

N. P. N. News Bureau

CLEVELAND, May 31. — Standard Oil Co. (Ohio) is notifying motorists of clean rest rooms at its stations by radio, roadside billboards, and two types of advertising at the stations themselves.

These are A-board curb signs, reading "Sanitary Rest Rooms", and window-sticker reproductions in color of the billboards 30 by 12 inches in size. These are pasted on a window at each service station.

The billboard posters portray two happy, beautiful girls breezing along in a swank roadster, with the Sohio emblem and the legend, Clean Rest Rooms, superimposed on the blue sky background.

Sohio's radio programs are built on the theme of "Historical Ohio", dramatizing such incidents as Morgan's raid during the Civil War and the commercial discovery of aluminum by a professor at Oberlin College, but the commercial plug calls attention to the clean rest rooms at Sohio stations.

To insure that the rest rooms are clean, in support of the advertising campaign, Sohio inspects the stations through district managers, station supervisors. The company checked on the checkers by an inspection of 200 stations picked at random in each of Sohio's 13 sales divisions.

Plant Inspections Are Feature Of Department's Annual Meet

By M. G. VAN VOORHIS
N.P.N. Staff Writer

BRADFORD, Pa., May 26.—Four refinery inspection trips and three short luncheon and dinner meetings made up the program of the annual meeting of the Department of Manufacture of the National Petroleum Assn. here May 25-26. Registrations for each days program was close to 70.

Following a visit to the Kendall Refining Co. the morning of May 25, E. E. Ebner, Quaker State Oil Refining Corp., addressed the luncheon on "A Flexible Refinery Water Supply," describing the water supply at the McKean plant of the company.

The most important factors he said were reliability of supply, suitable composition of water, freedom from failure due to power interruptions, and constant service line pressure.

Four wells with capacities ranging from 350 to 850 gallons per minute, creek water, and a 210,000-gallon storage tank are the refinery's supply, Ebner said. The well water was said to be ideal for cooling in all parts of the plant. Qualities of the waters were discussed and the means of providing uninterrupted water supply in spite of frequent electric power failures.

Plant Visited

One of the most appreciated advantages of the plant system was said to be its constant service-line pressure, making it possible to set valves for variable service and cooling water demands without upsetting other plant operations. Immediately following Ebner's discussion, the group motored to the McKean plant for a tour of inspection led by plant men who explained the operation of the various units in the plant.

Assembling again at dinner in the Emery hotel the group listened to a paper on "Employer—Employe Relations" by E. E. Bown of Kendall Refining Co. Bown pointed out that industrial relations demand more intelligent consideration on the part of management than ever before. This consideration "must exclude paternalism and beneficient autocracy, as these practices no longer have a place in present day personnel administration," he said.

Foremen's duties have changed him into a leader rather than a driver, he said, and men appreciate this change. "Management in general has been charged with being autocratic and our present national administration has seen fit to deal with this situation by providing a period of dictation by employes which has been aided by legislation and undoubtedly to a large extent by stronger leadership in the organized labor fields," Bown said. "Inasmuch as we have seen these two extremes, it seems that we must expect the pendulum to swing back to the middle point on the cycle, resulting in a much closer relationship between employer and employe."

Must Know Costs

"Men must be taught their responsibilities," Bown continued, "and the factory must have a knowledge of cost before the men can be held responsible for the cost of operation . . . There is a surprising increase in the number of companies who are now making annual reports to their employes in the same manner as reports are made to stockholders. These reports are written in such a fashion that the fact are easily understood by all workers."

Since it is found increasingly difficult to get undesirable workers off the payroll once they have been added, it was pointed out that there must be extreme care in the selection of workers, knowing the man, his health, education and background, he said.

The work of employe's credit unions was extolled by the speaker. Such a union, operated by employes at the Kendall plant has loaned over $16,000 in a 12-month period to some 240 employes without a cent lost as a result of failure to repay obligations. Employes were found to welcome the opportunity of discussing private financial affairs in order to get themselves on a rational budget program.

Ideas Were Borrowed

George F. Fitzgerald of Socony-Vacuum Oil Co., Olean, N. Y., gave the concluding luncheon talk sandwiched between an inspection of Kendall's waste disposal equipment and a visit to the Olean plant. He called attention to the interdependence of one industry with another by showing how petroleum engineers had borrowed ideas in processing equipment from other industries and had developed them to suit the conditions met in petroleum refining.

Credit was given the alcohol industry for the bubble tower and to Sorel, a Frenchman, for originating in 1893 the mathematical theory upon which rectifying columns are based. The pipe still was said to be an adaptation of the water tube boiler. Acid treatment and cracking were inherited from the coal oil industry. It was pointed out also that the petroleum industry has no corner on hydrogenation and polymerization; that the former has been used for many years to harden vegetable and animal fats and the latter is a method by which plastics such as Bakelite are manufactured.

Although petroleum refining is now recognized as one of the most important branches of chemical engineering and improvements of the last 15 years were credited to correct application of chemical engineering principles, it was stated that oil refining reached its maximum growth unaided by research. The complexity of crude oil in composition was cited as evidence of the magnitude of the problem of design of equipment and the reason for the present practice of leaving design to process engineering firms that specialize in this field.

Pollution Bill, Declared 'Dead', Still Breathes

N. P. N. News Bureau

WASHINGTON, May 31.—Left for dead more often than the nine-lived cat which always managed to stage a comeback, the stream pollution bill is again on the point of revival.

A meeting of the conferees to whom the widely-divergent bills of House and Senate were referred last August for compromise was scheduled for May 28, but did not materialize for lack of a quorum. Another will be attempted this week.

Reason for this latest activity, it is understood, lies in the change of attitude of at least two of the Senate's conferees, who have heretofore held out against all comers for the rigid federal control and enforcement provisions of the Senate-approved Lonergan proposal.

Now, it is said, some of the Senate conferees may have softened their harsh attitude toward the federal-state cooperation and provisions for pollution studies rather than federal control of the House-approved Vinson bill, with the result that a compromise measure embodying most of the provisions of House version may be agreed to.

Since the bill was referred to the conferees last August, several flurries of excitement over a reported "compromise" have roused the oil industry and others interested in stream pollution legislation. Industry, in general, favors the Vinson co-operation (loans and grants) and study type of legislation, if there is to be federal pollution legislation of any kind.

Each of these, however, has ended up against the stone-wall of disagreement, with House conferees declaring they would not accept the "policeman's club" provisions of the Senate bill, and Senate conferees taking the equally adamant stand that they'd rather see no pollution legislation at all than the Vinson bill. (N.P.N., May 18, p. 22) And each time the bill has fallen by the wayside and been left for dead.

However, a number of sportsmen's organizations have kept up their work in behalf of some sort of pollution control bill, and some of the interested industries are understood to have made various proposals for a compromise measure.

Whether the current "flurry" is no more than that is hard to tell. Unless there is some action on the bill before adjournment of Congress, expected by or shortly after mid-June, it will die for certain.

Oil Industry Receives 2.6% of PWA Money

N. P. N. News Bureau

WASHINGTON, May 31. — Public Works Administration projects purchased $48,466,162 worth of petroleum products from PWA's inception in July, 1933, through December, 1937, it reported today.

This is in addition to $501,296 worth of compressed and liquefied gases, the PWA release shows.

Total expenditures for materials and equipment during the four-and-a-half year period by PWA amounted to $1,833,113,302. The share of this received by the petroleum industry amounted to about 2.6 per cent.

Ills Of Pennsylvania Refiners Due to Many Causes, Says Gill

STATE COLLEGE, Pa., May 28.—Difficulties of Pennsylvania refiners are in good part due to their difficulty in maintaining balanced operations in the face not only of changing supply and demand for their products but also in changing proportionate returns in products from a barrel of crude run to their stills.

This was shown by John D. Gill, of the Atlantic Refining Co., Philadelphia, in an address on "The Economics of the Pennsylvania Oil Situation" at the eighth annual petroleum and natural gas conference here May 27 and 28.

Gill stated that output of lubricating oils from Appalachian refineries represented 32.2 per cent of refiners' income in 1923 and that in 1937 it represented 40 per cent of refiners' income. On the other hand, he said, general demand for lubricants increased 14 per cent from 1925 to 1937, a drop of 6 per cent in industrial consumption being offset by an increase of 37 per cent in automotive demand. In the same period Gill showed that runs to stills of refiners in the Appalachian area increased 60 per cent and production of Pennsylvania grade crude gained 67 per cent.

In 1926 he said that of all crude processed in the Pennsylvania area, half was of Pennsylvania grade origin while, in 1937, the proportion of Pennsylvania grade crude processed was 61.5 per cent.

Pointing to the fact that refiners' margins in this area are now the lowest since 1934 and that the region's gasoline margin had dropped from 3.36 cents a gallon in 1923 to .61 cents in 1937, Gill told the refiners that their economic position was in large measure due to forces outside their marketing area which they are powerless to control. He urged refiners to work at all times to avoid letting their stocks individually get to uneconomic levels, since this invited speculation which is opposed to refiners' interests in the long run.

In explaining the abrupt decline in refiners' prices in this territory since July, 1937, Gill said the recession affected demand for all products, but lubricating oils and fuel oils particularly, starting at that time but that refiners continued operating at unduly high levels for several months.

J. C. Martin, executive secretary of the Bradford District Pennsylvania Oil Producers' Assn., presided at the oil session of the conference. Frank M. Brewster, president of the Pennsylvania Natural Gas Mens Assn., presided during the natural gas session the morning of the 28th. Technical talks featured the sessions.

D. A. Campbell, of Eclipse Fuel Engineering Co., Rockford, Ill., concluded the conference with a paper on "Progress in the Industrial Utilization of Natural Gas," listing accuracy of control and uniformity of application as some of the reasons for the increasing use of gas by industries.

W. F. Clinger, of Clinger Oil & Gas Co., Tidioute, Pa., president of the Pennsylvania Grade Crude Oil Assn., was toastmaster at the dinner May 27. Speakers included J. E. Moorhead, executive secretary of the Pennsylvania Grade Crude Oil Assn., and Fayette B. Dow, general counsel of the National Petroleum Assn.

The petroleum and gas conference held here annually is participated in by the oil and gas associations of the Pennsylvania region under the auspices of School of Mineral Industries of Pennsylvania State College here.

Sees Agrol Fuel As Boon To Texas

N. P. N. News Bureau

TULSA, May 28.—The agrol fad, current panacea for the ills of agriculture, is making its appearance in Texas, largest oil producing state in the country.

Considerable space is being devoted by some Texas newspapers, particularly the Dallas News, to the theory that the Texas farmer will benefit greatly from operation of plants to make motor fuel alcohol from surplus grains and grain sorghums.

A recent meeting of Texas grain and feed men in Fort Worth heard two speakers on this subject. G. E. Blewlett, secretary-manager of the Texas Grain and Feed Dealers Assn., said that erection of such plants in Texas is certain to be of great importance.

It was announced at this meeting that the first filling station to sell the gasoline-agrol blend in Texas had been opened in Denison. Sales began May. 20.

A few days after the Fort Worth meeting, May 20 and 21, Victor H. Schoffelmayer, agricultural editor of the Dallas News, spoke to Panhandle Grain Dealers Assn. in Amarillo. His principal article in the News of May 22 was devoted to agrol and he predicted a vast market for farm products.

Any objections that might be raised on the ground that agrol would interfere with Texas' biggest industry, oil, were disposed of by Schoffelmayer. He foresaw great blessings for the oil man as well as the farmer.

"That the use of grain alcohol in gasoline blends will tend to prolong the life of existing oil fields and, lastly, that the petroleum industry would find itself amply rewarded for the comparatively small loss of motor fuel by the improved farmer buying power reflected in his purchase of more gasoline," he gave as his reasons for what he called the "practical view" of the "increasing use of power alcohol."

His article asserted that, if the use of agrol becomes national, blended 10 per cent with gasoline, it would require the production of 700,000,000 bushels of corn, artichokes, sugar beets or other products. That would mean the production from about 30,000,000 acres. The Texas share of this, he figured, would require the grain raised on 2,000,000 acres.

A 10 per cent replacement by agrol in Texas annual gasoline consumption would amount to 100,000,000 gallons, he estimated. To make this amount of grain alcohol from grain sorghums would call for around 35,000,000 bushels, he said. Texas now produces more than 50,000,000 bushels. Texas corn production is 80,000,000 bushels now and it would require 35,000,000 bushels more to produce this volume of alcohol for motor fuel entirely from corn.

Probable return in dollars to the farmers from these crops was not estimated.

More definite, however, is the return to Texas landowners from oil. Figures given recently by Charles F. Roeser, president of the Independent Petroleum Assn. of America, showed 1937 disbursements by oil companies of $155,656,000 for lease bonuses, rentals and royalties and oil payments.

Fisticuffs Mark Plant Reopening

By Telegraph

MUSKOGEE, Okla., June 1.—Sporadic fistfights with a score or more of participants injured have occurred here since May 26, when the Oil Workers Union, a CIO affiliate, called a strike at the recently reopened refinery of Pure Oil Co. Most of the fighting has occurred when nonstrikers attempted to change shifts.

The strike was called, CIO workers said, because the company failed to re-employ some of that union's members when the plant was reopened May 4, after being shut down for approximately four months. There had been keen competition for some time between the CIO and the A. F. of L. for the right to represent the workers in collective bargaining with the management.

Most of the fighting occurred the first four days of the strike. After an outbreak the morning of May 29, workers remained in the plant over night. Muskogee police established a barricade and city officials were quoted as saying they would take whatever steps were necessary to keep the refinery open. City Manager T. P. Clonts was quoted as saying he felt the union had violated its promise of "no violence". He also said the city would see that workers who remained in the plant would receive necessary provisions.

A representative of the company and of the union, meanwhile, have been conferring with representatives of the National Labor Relations Board attempting to reach a "peace formula".

To Enlarge Marine Terminals

PHILADELPHIA, May 31.—Atlantic Refining Co. will increase storage capacity at three marine terminals at a cost of $270,000. New tankage is to be built at Newark, N. J., New Haven, Conn., and Kettle Point (Providence), R. I., and docking facilities at Newark will be enlarged.

At Newark two welded tanks of 1,120,000 gallons capacity will be built. One new 750,000-gallon tank will be built at New Haven and one of 725,000 gallons capacity at Kettle Point. Contracts have been let to Chicago Bridge & Iron Co.

California Crude Output Is Lowest in Nine Months

BULLETIN

By Telegraph

LOS ANGELES, June 1.—California crude oil production May 30 was 667,000 barrels, the lowest since last August, and compares with 701,996 barrels on April 30. Wilmington production was 89,708 barrels, as compared with 103,100 barrels on May 21. Shutdown of the Lakeview field June 1 for 10 days is expected to reduce the state's total to below 655,000 barrels.

* * *

N. P. N. News Bureau

LOS ANGELES, May 28. — Although California crude production for the first 25 days of May averaged 33,977 barrels a day less than for the same April period, proration authorities last week expressed dissatisfaction with curtailment compliance by many producers and warned that dangers of a crude cut were not past.

Pointing to an increase of 2,599,656 barrels in stocks during April, despite a substantial increase in Pacific Coast domestic gasoline demand for the month, compared to the 1937 period, the central committee of oil producers said supply was not yet in balance with demand.

In monthly meeting May 26 the committee estimated California crude demand for the month of June would not exceed 620,000 barrels daily, with 615,000 barrels of this amount to be allocated to wells on production the first of the month and 5000 barrels set up as a reserve for new completions.

The May quota, originally set at not to exceed 620,000 barrels, was later raised to 624,755 barrels to correct certain inequities. It now appears likely the state will average between 60,000 and 65,000 barrels a day in excess of the May quota.

On May 25, total output reported to the oil umpire was 679,000 barrels and the average for the May 1-25 period was 686,715 barrels daily. Low output for the month was reported on the 22nd—673,456 barrels. Practically all this improvement has resulted from additional curtailment by producers in the Wilmington and Kettleman Hills fields, initiated May 21.

A more pronounced effect of the new drive for additional curtailment in these and other California fields is expected to be shown in early June production reports. Producers at last week's meeting felt confident average production during June would not exceed 655,000 barrels a day, or about 30,000 barrels under the indicated May average.

Several bones of contention in the California curtailment setup came in for considerable discussion as producers mulled over various difficulties in bringing the state's output down to quota.

One of these points of controversy concerns the transferring of allowables from one field to another. It has been the practice of some producing companies to underproduce their allotments in certain fields—where market demand is lacking—and to add this underage to their quotas in other fields where market demand is good.

For example, a company with heavy oil production in a San Joaquin Valley or Coastal field and with light oil wells in a Los Angeles Basin field, will cut its heavy oil production to a minimum and overproduce its marketable light oil.

The California voluntary proration authorities have consistently held to the opinion that each field should be considered separately in adherence to quotas and have refused to recognize allowable transfers but, being without legal compulsion, they are glad to get what compliance they can.

Additional curtailment of heavy oil production on the west coast is expected to follow the announcement by Union Oil Co. that, effective June 1, it will discontinue purchases of oil in the Santa Maria Valley. With the only pipeline into the area, Union several weeks ago announced a 23 to 26-cents a barrel reduction in its posted price for this oil, which had the effect of cutting the company's purchases in half at this field.

Lack of market demand for Santa Maria crude—which has a relatively low gasoline cut and high percentage of asphalt, with practically no in between products—is also understood to have prompted the company to shut down all of its producing wells in the area June 1, with the exception of offsets, which will be operated to protect against drainage.

Current production in this field is about 700 barrels daily, against an allowable of 17,260 and an estimated potential production in excess of 100,000 barrels a day.

Union's action will not affect operations of other purchasers in the field which have been trucking the oil to the Los Angeles Basin. Two small refineries which are being built in this area, are scheduled to be completed during June and will afford some outlet for the heavy production. The plants are being primarily designed for making road oils.

Californians Block Oil Tidelands Grab

(*Continued from page* 17)

House Rules Committee has assured the California delegation that there will be no rule granted for floor consideration of the measure, which would declare federal title to all tide-covered lands off the coast of California between low water mark and the three mile limit, until after a hearing of the California congressmen.

During the past week the Californians who have been here seeking to prevent passage of the resolution have contacted all members of the State delegation, have met with them in formal meeting, and have circulated about the Capital contacting whomever might join their battle. (N.P.N. May 25, P. 9.)

Strengthening the belief of the Californians that they have killed the measure for this session is the fact that the Rules committee's calendar is crowded with other bills which it must consider during the last few days of the session and which precede the Tidelands resolution. In addition, an informal poll of the committee shows that a majority of its members are not in favor of the measure.

Oil Workers' Union Meets in Houston

N. P. N. News Bureau

WASHINGTON, May 31.—John Brophy, national director of the Committee for Industrial Organization (CIO), and Edwin S. Smith, member of the National Labor Relations Board, will address the convention of Oil Workers International Union at Houston next week, it was announced at the union's headquarters here today.

More than 350 delegates are expected at the convention, it was said. Keynote address will be delivered by Harvey C. Fremming, president of the union.

Shell Employes To Elect Union

N. P. N. News Bureau

WASHINGTON, May 31. — National Labor Relations Board has ordered elections to be held to determine whether California employes of the Shell Oil Co. shall be represented for collective bargaining purposes by the American Federation of Labor or the Committee for Industrial Organization.

No dates for the elections have been set. They will be held for all employes in California of the company's production, pipeline and refinery departments, together with auxiliary automotive and telephone departments.

On the one side, in all elections, will be the "vertical" C. I. O. union, Oil Workers International Union, headed by Harvey Fremming. Five different A. F. of L. unions, each covering a particular branch of the workers, will be on the other side of the ballots.

The A. F. of L. Unions whose names will appear on the respective ballots are: International Association of Machinists, International Brotherhood of Electrical Workers; International Brotherhood of Blacksmiths, Drop Forgers, and Helpers; International Brotherhood of Boilermakers, Iron and Ship Builders, Welders and Helpers of America, and Oil Industry Metal Trades Council of California, the Board said.

Groups which vote for the CIO union will be combined into a single bargaining unit with that union as their representative, it was said. Where a ballot in a group results in a majority for one of the A. F. of L. Unions, employes within that group will constitute a separate bargaining unit.

The forthcoming elections are the result of negotiations lasting more than a year. On May 24 last year the Board declared that all employes who will vote in the elections were a "single appropriate bargaining unit," and certified the oil workers', machinists', electrical workers', blacksmiths' and boilermakers' unions as their joint representatives.

Negotiations with the company later came to a standstill, the Board said, when the five unions could not come to an agreement over the A. F. of L. unions' proposal that grievances be handled through the particular union having jurisdiction over the work being performed by the "aggrieved" employe.

Regulation Of Well Drilling Advised by A.P.I. Committees

WICHITA, Kans., May 28.—Recommendations which may prove a start to bringing the drilling of wells into the general proration program and relieve a situation becoming increasingly acute to well owners, were presented to directors of the American Petroleum Institute at its mid-year meeting here which closed May 26.

The recommendations were in reports made by an engineering and a legal sub-committee of the institute, the two committees being appointed more than two years ago to study the subject of "unnecessary" wells, which have been estimated to have cost the oil industry from $85,000,000 to $100,000,000 annually in recent years.

An "unnecessary" well, from the standpoint of these committees, is one not needed in obtaining the maximum ultimate recovery from an oil field. Prime example quoted is the East Texas field, where engineers calculated one well to 20 acres would drain the sand efficiently but where wells now average one well to a little more than five acres.

Some means for establishing proration allowables other than the customary one of basing well allowables upon potential capacity of a well to produce must be found, if drilling of necessary wells is to be avoided.

Acreage Disregarded

The size of the tract drained has no relationship in most fields to the allowable production accorded to the well. An operator on a half acre may get just as big a rating as his neighbor who has a well on 10 acres. The latter, therefore, to obtain his proper proportion of the oil and to satisfy the landowner, must drill more wells on his 10 acres, even though one would drain the sand effectively.

Unnecessary wells have contributed greatly to the low allowable per well which now prevails in several states. Each new well must be squeezed into the general market outlet for the pool and each new well thus lowers the quota for every well. This has greatly lengthened the payout time for new wells, in some active areas it is now six and seven years.

Recommendations of the legal sub-committee on well spacing chairman of which was John Kilgore, of Wichita Falls, Texas, were as follows:

Recommendations

"The evil consequences to the oil and gas industry and to the general public which flow from the drilling of unnecessary wells in such great numbers call for remidial action on the part of the industry to the extent that this is legally possible and on the part of the appropriate regulatory bodies of the several oil states.

"There is very little that the individual operator can do to remedy the situation except to refrain from becoming an aggressor in precipitating an unnecessary drilling program. If his neighbors should drill unnecessary wells, he is forced to drill to protect himself from drainage and to perform the obligations of his lease, unless he is granted such an adjustment in his allowable production as will enable him to produce his fair share of oil and gas without drilling more wells on his lease.

"For legal reasons, those in the industry cannot attack and solve the problem by concerted action—that is, by agreements not to drill unnecessary wells. With the spacing patterns prescribed for them, and their allowables fixed by governmental authorities, they must often times either drill down to the most dense pattern or lose out in the race.

"In these days of regulated drilling patterns and regulated production of oil and gas the onus of prescribing and enforcing proper orders, rules and regulations to prevent the drilling of unnecessary wells largely rests with the regulatory agencies of the several oil producing states. It is fair and proper that we point out several ways in which the conservation authorities of the several oil-producing states may help to remedy the situation. Some practical suggestions follow:

Practical Suggestions

"A. Fix a top allowable for each field at such a point that physical waste will be avoided and the reasonable market demand will not be exceeded.

"B. Prescribe a uniform drilling pattern for each field as soon as possible after production is obtained and grant no exceptions to such a pattern unless localized conditions in the field definitely require that this be done in order to prevent waste. If an operator is granted such an exception, then so adjust his allowable as to enable him to produce no more than his fair share of the oil and gas.

"C. Require pooling of small or irregularly shaped tracts on a fair basis in order to preserve, so far as possible, a uniform spacing pattern.

"D. So adjust the allowable production between wells and separate properties in the field that, after an operator has drilled such number of wells on his property as will enable him reasonably to produce the recoverable oil and gas in place under his land, he will not be required to drill additional wells in order to produce his fair share of oil and gas in order to prevent unreasonable drainage which is not equalized by counter-drainage through his wells.

"E. In prescribing the allowable for each well or property the regulatory agencies should not give undue consideration to wells and potentials unless the statutes specifically require that this be done.

"F. If the law requires that production be allocated on a well-potential factor, then strictly adhere as nearly as possible to a uniform spacing pattern, to the end that uniform withdrawals from the reservoir may be had so far as practicable.

"G. The regulatory agencies should establish an appropriate proration unit in each field and, regardless of the number of wells drilled on such units, should allocate production between such units so as to obtain ratable production, to the end that each operator will obtain his fair share of the recoverable oil and gas from the pool."

The recommendations of the special study committee on well spacing made up of engineers, of which M. Albertson, Shell Petroleum Corp., Houston, is chairman were:

Engineering Principles

1. "It is generally agreed that the maximum rate at which a pool can be produced efficiently and economically can be determined.

2. "To gain the greatest ultimate recovery, ratable withdrawals from the reservoir must be maintained.

3. "The rate of withdrawal materially effects the drainage area of a well. Given the former, engineers may, within reasonable limits, determine the latter. Under restricted withdrawal, regional reservoir drainage results and the drainage area of a well becomes indeterminate, reaching in some cases to remote points in the reservoir. Under such conditions, the efficient drainage area of a well becomes that size of uniform geometrical pattern which will insure adequate wells for reservoir drainage and ratable withdrawal.

4. "The same or greater efficiency of recovery can be obtained by wider spacing at lower rates of flow per acre than by close spacing at excessive rates of flow per acre.

5. "Well density, within reasonable limits, is not a factor effecting ultimate recovery when ratable withdrawals by the owners of the oil in place is observed in a pool. Where the allocation does not recognize the taking upon the basis of recoverable oil in place, uniform spacing units are necessary to tend to procure ratable withdrawals.

6. "The maximum ultimate recovery by eliminating underground waste and preventing premature or improper encroachment of water is obtained by the efficient use of reservoir energy, either natural or artificially introduced, limited only by economic considerations.

1. "In view of the above principles outlined, it is recommended the maximum rate of a pool's production should be specified.

2. "An allocation unit should be adopted which is sufficiently large to prevent the compulsory drilling of unnecessary wells. The well density of such unit can be increased depending on varying reservoir conditions in order to adequately drain the pool at the rate of withdrawal specified. The position of the well in the allocation unit determines the acreage assignable to the well.

3. "The method of distribution to the allocation units should assure ratable withdrawal from the reservoir and no uncompensated drainage across property lines."

Ellick Bott's Mail

TULSA, May 28. — Postcard from D. E. Buchanan to Ellick Botts shows that "Buck", the president of Hanlon-Buchanan, Inc., natural gasoline marketers and manufacturers, has reached Stockholm on the tour of Europe he began several weeks ago.

Problems Of Kansas Producers Told To A. P. I.

Producing Cost of Closely Spaced Kansas Wells Tops Price of Oil

WICHITA, Kans., May 28.—Data on operating costs of Kansas oil wells to show that, in fields having closely spaced wells, the total cost of maintaining production with declining allowables exceeds gross income per barrel of oil was presented by Eugene A. Stephenson, head of the new department of petroleum engineering at the University of Kansas, speaking before the mid-year meeting here of the American Petroleum Institute.

Stephenson estimated the amortization rate at 60 cents per barrel, dry hole cost at 10 cents, operating and tax costs 30 cents, bonuses and rentals 7 cents, interest 14 cents, and office expense 3 cents, making total of $1.24 per barrel, and leaving only 1 cent for exploration.

"Under such circumstances," Stephenson said, "the incentive to drill for oil has practically vanished. Since it has already been shown that close spacing is largely responsible for these conditions, the rational solution is obvious indeed, unless drastic cuts in wages, salaries, and personnel be advocated. The latter would be an unwise procedure, especially since labor is not responsible for the trouble."

Stephenson urged serious consideration be given to wider spacing of wells, asserting both operators and landowners would benefit. Close spacing, he declared, cannot be defended from the standpoint of public or private interest, ultimate recovery, conservation, sound business practice, protection of the small landowner, or any other valid reason.

He estimated that, with wide spacing, capital expenditures per acre would be reduced by approximately 50 per cent, fixed charges would be less, operating costs per barrel substantially lower. He blamed close spacing for what he termed the "present disequilibrium between capacity to produce and market outlet."

Accident Prevention

A recommendation that oil companies take a more direct interest in the accident prevention problems of oil field contractors was made at the Accident and Fire-Prevention group session May 25, which closed the eighth mid-year meeting here of the American Petroleum Institute.

C. L. Swim, head of Skelly Oil Co.'s compensation insurance department, made the recommendation in his paper, "Contract Operations—a Problem in Accident Prevention." Stating that many of the operations incident to the oil business are accomplished under contract by independent contractors, Swim said that, if a contractor has an unsatisfactory accident experience or makes inadequate insurance arrangements against his liability risks, it might add considerably to the cost of the contract work to the oil company.

"When a contract is let, legal considerations—which vary by states—require the owner to give thought to the liability that may be his by reason of such contract operations," Swim stated. "We believe that a proper analysis will demonstrate that the owner should also give consideration to the accident record of his contractor to a greater extent than is generally the practice.

"Pay the Freight"

"I say this because, if the owner requires the contractor to make proper insurance arrangements, he has definitely relieved himself of liability for other than the cost of such insurance—which the contractor will make a part of the price he charges the owner."

After discussing the wide variance in legal provisions in the several Mid-Continent producing states, Swim said; "It would appear that the time has arrived when oil companies, as units and as a group, should think actively of these contractors who do so much of certain parts of our business that they are substantially our partners instead of strangers with whom we deal at arm's length; and, for this reason, we should give more thought to their problems. Perhaps we can even help them solve some of these problems."

Swim also stressed the point that the accident experience of the negligent contractor is counted in with that of the long experienced and careful contractor when the insurance companies determine rates, and that the oil companies have to "pay the freight" for the more unreliable contractors although they may do business strictly with the reputable and long established contractors.

The Automotive Survey Committee, meanwhile, recommended that some of the road test procedure be simplified. This recommendation was the result of a three-day study made at Ponca City, Okla., by that committee and the Co-Operative Fuel Research Committee the week prior to the A.P.I. meeting here.

One important recommendation was that of making rests on all types of automobiles just as they are turned over to the testers. Instead of taking the cars into the garage and tuning them up before tests are made, the new plan calls for taking cars irrespective of their mechanical conditions and running tests without any "tune up."

Calif. Refiner Signs Dubbs License

CHICAGO, June 1. —The Mohawk Petroleum Corp. of San Francisco has signed a license agreement with Universal Oil Products Co. to cover existing cracking operations in its refinery at Mopeco, near Bakersfield, Cal.

Alfred Marsten is president and Frank Long vice president of the Mohawk Petroleum Corp., which recently purchased the Mohawk Petroleum Co.

Mohawk is the second independent California refiner to sign a Universal license agreement for the use of the Dubbs cracking patents, the first being the Wilshire Oil Co., Inc., of Los Angeles, which in 1936 installed an 8000-barrel, two-coil selective type Dubbs cracking unit, a 2,500,000 cubic feet per day U.O.P. polymerization plant a year later and now has under construction a 4000 barrel Dubbs reforming unit.

H. P. Baker Dies

TULSA, May 31.—H. P. "Red" Baker, assistant manager of the Baker Oil Co., North Little Rock, Ark., died May 22 in a Little Rock hospital, following an illness of three months caused by undulant fever. Baker, 35 years old, was a nephew of Walter Baker, president of the company, and had been associated with his uncle almost from the formation of the company several years ago.

Desalting Crude Is Discussed at Refining Session

N. P. N. News Bureau

WICHITA, Kans., May 25.—The program of the division of refining of the eighth mid-year meeting of the American Petroleum Institute, made up as it was of speakers from both the equipment and the manufacturing branches of the refining industry, proved sufficiently interesting to hold the attention of a large number of technologists through three sessions here May 24 and 25.

The listeners heard many of their old problems discussed in a new light, heard in more detail some of the newer methods in refining and were given excellent description of some of the newer equipment and processes. Discussion of some of the papers was lively, particularly papers on those subjects in which virtually all refiners are interested.

One of the highlight papers was that on "Laboratory Control of De-Salting Processes and the Corrosion of Distillation Equipment," prepared by L. L. Davis, J. M. Jones and C. A. Neilson of Continental Oil Co., Ponca City, and read by Davis.

In discussing the paper, J. A. Jamison of the institute staff said he had spent the past year traveling over the country visiting refiners and discussing with them corrosion problems, and that he thought the paper gave for the first time some idea as to how to attack the problem without costly "practical experience."

Controlled at Refinery

Charles D. Lowry of the Universal Oil Products Co., Chicago, raised the question of how far could one go with desalting in the field. Davis said that he still believed it more practical to do desalting at the refinery, although he realized that this meant at times a duplication since some desalting was done in the field. He pointed out that such a variety of crudes were received at the refinery at times that final control must necessarily lie at the refinery.

The point was stressed also in the discussion on desalting that it was highly essential to have positive control of the

Ph. One individual said that, at a refinery processing Michigan crude, desalting had been done successfully as they thought but corrosion continued to cause trouble until an automatic Ph control was put into operation. It was found then that the operator who had been responsible for the Ph of the charge had not been as diligent as he might, but that with the automatic control the corrosion problem was virtually eliminated.

Anti-Knock Problem

The usual discussion over the question of whether the automobile manufacturer should build a car to which the refiner should fit the fuel or vice versa developed following presentation of the paper on "The Anti-knock Requirements of Automobiles." The paper was prepared by T. B. Rendel, L. E. Hebl and R. J. Greenshields of the Shell Petroleum Corp., Wood River, Ill., and read by Rendel.

In the paper the statement was made that, "Continued testing (for anti-knock) without reconsideration of the problem has caused us to develop the impression that the anti-knock requirement problem is the fuel industry's own, rather than one of co-ordination between the car manufacturers and fuel refiners."

A. L. Clayden of the Sun Oil Co., Philadelphia expressed the opinion, however, that engines already have octane ratings higher than that of regular gasoline and that the manufacturers put on the spark adjustments and "soften" them down to handle the wide variety of fuels now offered the motoring public.

A considerable portion of one session was devoted to description of various methods of hydrogen-sulfide removal, while another session was devoted primarily to a discussion of still tube problems. The paper by C. O. Rhys of the Standard Oil Development Co., Elizabeth, N. J., on "Application of Bailey's Theory to Tube Stress Calculations" was praised by several in the audience, who declared the method described was one that will always give safe allowables and no allowance had to be added for corrosion.

Sales Agency Closed

TYLER, Texas, May 31. — Offices of the East Texas Marketing Assn. were to be closed June 1, Manager Robert N. Cline announced. The association was formed in 1935 by East Texas refiners who desired a central sales agency to market their products.

New Equipment Discussed By A.P.I.

WICHITA, Kans., May 28.— Technical subjects applying to drilling and production were discussed in the several prepared papers before the production division of the American Petroleum Institute in its mid-year meeting here May 23-25.

A considerable change has occurred in the methods used by oil companies in selecting field equipment, said Harry H. Power, head of the petroleum engineering department, University of Texas. Besides the purchasing agent and the salesman—many of the latter nowadays are engineers — said Power; "a third party has entered the picture in recent years, serving not only as technical advisor to the purchasing departments, but often making the initial investigation of the manufacturers' product.

"These assistants are not painted as technical robots without human virtues, but they sometimes had an uncanny way of asking questions concerning the merits of the equipment their companies investigated for possible purchase. Such situations probably launched the equipment salesman upon a new adventure of collecting complete data on his wares, available for ready reference. This procedure marked a new era in sales approach and methods."

After giving several specific cases of co-operation between the oil operator and manufacturer in the development of equipment to meet new conditions and to deal more effectively with old ones, Power said:

"It is impossible to list the many equipment problems confronting the producer today. The many specifications and standards for equipment of the American Petroleum Institute indicate the volume of work, directed jointly by producer and manufacturer, towards a common objective. The sales engineer has grown to be a specialist and consultant, and the producer has profited accordingly. The production engineer has learned much of design and factory methods. Accordingly, he has helped harmonize the manufacturer's idea of what he is selling with the producer's idea of what he is buying."

Conserving Gravity

Conservation of gravity of crude oil not only saves volatile constituents but volume and is a true form of conservation, declared S. F. Mauney, Jr., of Carter Oil Co. and George M. Vandaveer, Jr. of E. H. Moore, Inc., both of Tulsa, in their joint paper. They cited estimates that losses from well to refinery had been reduced from 6.2 per cent in 1921 to 2 per cent in 1934. The authors said they thought the 2 per cent figure was "entirely too small for 1934, and even for 1938," but applying that figure to the Mid-Continent daily production of 1,910,000 barrels, "the loss amounts to 40,000 barrels which at $1.22 (36° A.P.I. gravity oil) amounts to $48,800.

"More than 50 per cent of the losses occur on leases where gravity affects price; and the estimated evaporation loss indicates approximately an 0.4-degree loss in gravity, which means that probably one-third of the production is changed to a lower gravity bracket—thereby losing 2 cents a barrel in price. This amounts to a further daily loss to Mid-Continent producers of $6400 which, added to the volume loss, makes a total daily estimated loss of $55,200.

"This estimated value does not represent the true loss, as the portion evaporated is gasoline—which is much more valuable than the average price for crude indicates. And, too, these estimated losses are not the only ones to be considered, as some material losses occur with certain methods of production, such as gas-lift, flowing with high gas-oil ratio, etc."

Methods Employed

The authors discussed modern practices in treating, tankage installation, painting tanks with light-colored paints, treating oil on leases and other conservation of gravity methods. Knowledge of most such improvements is general, they said, but that many producers do not follow the best practices, especially during periods of flush production when necessity for speed is the ruling factor. They stated;

"While it is true that many major problems present themselves during new or flush production periods, it does seem that, with the small expenditures and work required to institute gravity-conservation methods and equipment, this could be done, in a large part, during the routine work of installing tankage, treaters and other equipment for producing, handling and storing petroleum.

"If it is worthwhile to make changes in existing equipment . . . it is certainly worthwhile to make original installations correctly. The benefits to be obtained by the oil industry as a whole mount into millions of dollars, and in this day of slower return of investment they assume considerable importance."

The mid-year session, which closed the night of May 25 with a complimentary dinner and entertainment furnished by Wichita oil and supply companies, established a new attendance record. There were 1094 registrations, A. P. I. officials reported.

Wichita oil men were complimented on their efforts to make the convention a success. One of the entertainment features was the open house the afternoon of May 24 at the country home of J. A. Vickers, president of the Vickers Petroleum Co. The annual golf tournament was held May 26.

Drop In Crude Stocks Continues

N. P. N. News Bureau

WASHINGTON, May 31.— Another decrease of more than a million and a half barrels in crude stocks during the week ended May 21 brought stocks on that date to 302,597,000 barrels—2,474,000 barrels below the same week last year—according to Bureau of Mines figures.

This decrease was attributed by the Bureau to the fact that crude production for the week declined to the lowest level since the first week in 1937, but that crude runs to stills rose to the highest level since about mid-January this year. Daily average production for the week was about 3,190,000 barrels, and crude runs to stills were 3,225,000 barrels.

Stocks by grades, showing changes, follow:

Grade	May 14	May 21	Chng.
	(Thousands of Bbls.)		
Penna. grade.	4,652	4,686	+ 34
Other Appal...	1,053	1,036	— 17
Lima-NE Ind.-Mich.	1,181	1,183	+ 2
Ill.- SW Ind...	10,021	10,039	+ 18
N. La. & Ark..	8,762	8,684	— 78
W. Tex. & SE New Mex...	29,631	29,489	—142
East Texas ..	25,636	25,536	—100
Other Mid-Con.	126,364	125,833	—531
Gulf Coast....	23,626	23,067	—559
Rocky Mts....	23,371	23,193	—178
California	26,491	26,598	+107
Foreign	3,460	3,303	—157
Total reptd..	284,248	282,647	—1601
Unreptd.	19,950	19,950	.....
Total stocks..	304,198	302,597	—1601

Cut In Allowables Firms Crude Market In Southwest

(*Continued from page* 17)
purchasers' inability to take as much oil as the commission permitted to be produced in past months.

Okla. Total Set

About the same situation existed in Oklahoma on June 1. The corporation commission members had not agreed on how to divide the 405,000 barrels daily total for the state. They had agreed on the total but how to distribute this in such way that the small amount of pipeline proration now existing would be ended and recurrence avoided on the part of one large buyer, which said it was again faced with that necessity unless the allowable for June brought production in the fields where it buys into line with its recently reduced requirements.

Several students of the supply-demand question have agreed that a producing level of 2,700,000 barrels daily or less east of California maintained through the summer months would create a healthy situation. Final figures for May are not available but the estimates of production made by the American Petroleum Institute show that for the four weeks ended May 21 the average production was 2,674,000 barrels.

The U. S. Bureau of Mines forecast of demand for June east of California is 2,683,300 barrels daily, but this allows for no reductions in crude oil stocks and the June allowables of the several prorated states are such as to yield a daily average substantially under the bureau's estimate, which would take care of some liquidation of crude oil stocks, assuming that the bureau figure is substantially correct.

Threat of litigation to contest the Texas Railroad Commission order shutting in producing fields of that state two days a week seems to have blown over, at least nothing more has been heard of it and no suits have been filed. The five-day production week will continue through June.

Tempers are growing short in the centers of oil regulation. The job of issuing rules and production quotas proceeds serenely as long as demand is brisk and purchasers appear only to ask for higher allowables. When it goes the other way, the proration machine begins to creak and the engine to knock.

In Oklahoma City the conservation officer, William J. Armstrong, jousted verbally with Commissioner Albert Sidney Johnston Shaw. The latter has not looked with favor on the rapid reduction of allowables this month. He took occasion in the monthly hearing May 26 to inquire why reported production in the state was so much above the figure set by the commission.

Armstrong attempted to explain that in Oklahoma the operators work on a monthly, not a weekly basis, and that most of them try to get their quotas into the tanks early in the month. He was certain, he said, that the production for the entire month would not look so bad. Shaw was impatient of this reasoning and there was a lively tilt.

Coming Into Line

Purchasers say that their takings the past week have come down sharply and that the figures for the whole month will not be as much out of line as the estimates for the first three weeks of May indicate. American Petroleum Institute figures showed daily average production for the state of 486,800, 484,650 and 471,300 barrels for those weeks.

Armstrong might have retorted, but didn't, that the commission was late in getting out an order and that for several days the operators worked under the 475,000-barrel allowable which prevailed in April; then an order was issued calling for 460,000 barrels. This applied to the first 10 days. Then an emergency order was written scaling the total down to 405,000 barrels and this was followed by a third order setting the daily figure for the month at 422,742 barrels. So there has been confusion during most of May because of the rapid changes and producers and purchasers were mixed up on what to do and it takes a little time to refigure schedules on wells and leases.

It looks, however, as though it would take several days of complete shutdown to bring the Oklahoma production for May to the level set in the third order of the month. Such shutdown not being in sight, there probably will be a substantial excess-over-allowable recorded when complete figures are compiled.

The Corporation Commission of Kansas has been simmering away for several weeks over this pipeline proration matter. Purchasers were not buying as much oil as the commission allowed to be produced. Chairman Sloan of the commission, seems to have two theories that are new. They are, (a), that purchasers are obligated to take as much oil as they estimate to the commission that they will require the following month and, (b) that a purchasing company must take the allowable production as set by the commission or quit buying altogether in a specific pool. There can be no such thing, legally, he has indicated, as merely meeting part of the conditions of either (a) or (b).

So, the simmering developed into boiling and the commission hauled off with citations last week against three purchasers to appear in Topeka, June 2, and show cause why they should not be held to have violated the commission's May order. The three are the Stanolind Crude Oil Purchasing Co., Sinclair Prairie Oil Marketing Co. and Phillips Petroleum Co. These three and two others were named in the proration order for May as having contributed to the big "underage" of production by their adoption of pipeline proration. The two others, Kanotex Refining Co. and The Texas Co., went back on 100 per cent purchase basis for May and were not cited.

Estimates Only

Some oil company attorneys assert that the commission's attitude is not based upon any law now on the books. They assert that the "nomination" to purchase, called for by the commission each month, is custom only and, further, that a buyer who says he thinks he will want a stated amount per day is not entering into a contract to take that much but is merely estimating.

Requirements change quickly these days. Carter Oil Co., which lifted its pipeline proration this month in Oklahoma except in two fields, told the corporation commission at the monthly hearing that it is again long on oil for June—10,950 barrels daily was the estimate—and that, unless general production was reduced sufficiently to whittle that much off its takings, or somebody relieved Carter of that amount, it would have to put in a 70 per cent of allowable purchase plan in all Oklahoma fields where it buys. An increase in purchases in Illinois by one of Carter's customers and a reduction by another because of lessened crude requirements are understood to be reasons for its inability to continue buying at the May level.

This company notified the corporation commission that, in the Wildcat Jim and Tussey fields of southern Oklahoma, the company would take not more than 10 barrels per well, effective May 28. It had been taking up to 25 barrels. These two fields were retained under pipe line proration after Carter lifted such restrictions on other fields under the May allowable production order. Rock Island Refining Co. is prorating similarly in the Tussey field.

Oklahoma's top figure for June was set by the commission at 405,000 barrels daily, after hearing, and there was no marked sentiment in favor of a greater amount. Nearly all the producers recognize that it wouldn't take much excess crude right now to bring down the price.

Same Level Held

Louisiana's Conservation Commission, unmoved by the pleas of conservation authorities of other states, continued the June allowable for that state at about the same level as the May figure. The total set was 250,475 barrels daily, only 975 barrels down from the May top. The Rodessa field was cut 2000 barrels but 1000 was added to Lisbon.

Reports from Texas are that the Saturday and Sunday shutdowns are bringing production close to the 1,159,713 barrels daily figure which the Texas Railroad Commission engineers estimated would be the June average. The commission's order provides for a new feature next month. Heretofore, allowables in a pool were permitted to swell during the month as new wells came in, the allowable for each new well being added to the total. Now, readjustment will be made June 15 and the total for a field will be put back to what it was on June 1.

An incidental effect of the five-day production week in Texas was a pay cut for the Railroad Commission personnel, including the three members of the commission. The oil and gas division is supported by tax of 3/16 cent per barrel of oil produced; any decline in volume of production means fewer dollars. The commission said it could not reduce personnel because the work was about the same, so a five per cent salary cut was made. The three commissioners reduced their own pay five per cent of $166.67 monthly, that being the portion of their $583.33 monthly pay coming from the oil and gas division.

O.P.M.A. Fall Meeting

COLUMBUS, O., May 31. — The fall conference and golf tournament of the Ohio Petroleum Marketers Assn. will be held at Youngstown, O., on Oct. 5 and 6, Robert A. Warfel, executive secretary, announces.

Gas Oil And Fuel Stocks Reach All-Time Peak, A. P. I. Reports

N. P. N. News Bureau

NEW YORK, June 1.—Stocks of gas and fuel oils rose 2,202,000 barrels to another all-time high of 134,315,000 barrels on May 28, despite a sharp decline in crude runs to stills, the American Petroleum Institute's report of U. S. refinery operations for the last week of May today showed. Gasoline stocks declined 229,000 barrels.

All refinery districts reported substantially increased inventories of gas and fuel oils except the East Coast and Louisiana-Gulf districts. Inventories of gas oils and distillates for the country as a whole increased 408,000 barrels and residual fuels, 1,794,000 barrels. California residual fuel stocks jumped 1,263,000 barrels and Texas-Gulf inventories were up 313,000 barrels.

Stocks of all gas and fuel oils on May 28 were 37,035,000 barrels, or 38 per cent, higher than stocks on the same date last year. Gas oils and distillates were 5,319,000 barrels, or 29 per cent, and residual fuels 31,716,000 barrels, or 40 per cent, higher.

Sizeable gains in inventories of gasoline were reported for several districts, the most notable of which were East Coast, 186,000 barrels; Louisiana-Gulf, 152,000 barrels; and Appalachian 111,000 barrels. These gains were more than offset, however, by the following declines: Indiana-Illinois-Kentucky, 297,000 barrels; Texas-Gulf, 233,000 barrels; Oklahoma-Kansas-Missouri, 58,000 barrels; and Inland-Texas, 56,000 barrels.

The decline in gasoline inventories continues at a more rapid rate this year as compared with last year, the Institute's reports show. Stocks on May 28 were 8,076,000 barrels above stocks on the same date last year, while on May 21 this year they were 8,111,000 barrels above stocks on the same 1937 date.

Refinery crude runs at plants reporting to the Institute were cut 75,000 barrels on daily average, or from 79.2 per cent to 77.8 per cent of capacity. Texas-Gulf runs were reduced 51,000 barrels and Indiana-Illinois-Kentucky runs, 34,000 barrels.

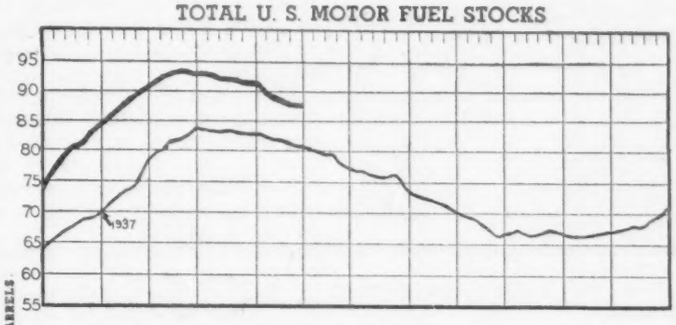
DAILY AVERAGE PRODUCTION IMPORTANT DISTRICTS
American Petroleum Inst. Figures

	Week Ended May 28	Week Ended May 21
	Barrels	Barrels
Oklahoma City	92,050	103,200
Total Okla.	439,650	471,300
East Texas	362,550	362,250
Total Texas	1,187,800	1,193,650
Kansas	143,550	155,450
Total La.	256,100	253,700
California	677,700	696,600
E. of Rockies	2,420,950	2,922,050
Total U. S.	3,098,650	3,175,750
Crude Imports	101,280	47,570
Tot. new sup'ly	3,199,930	3,223,320

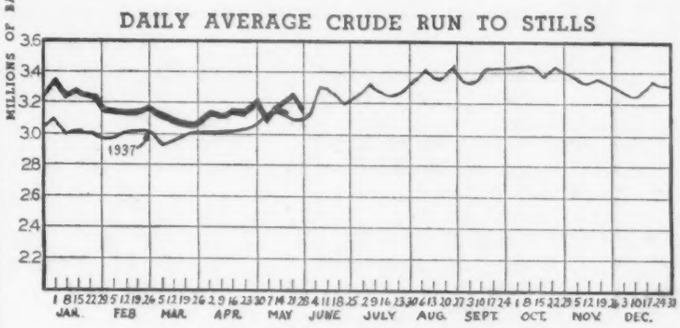
J. Howard Marshall

SAN FRANCISCO, May 28.—J. Howard Marshall, former member of Petroleum Administrative Board under NIRA, has become a member of the firm of Pillsbury, Madison & Sutro.

TOTAL U. S. MOTOR FUEL STOCKS



DAILY AVERAGE CRUDE RUN TO STILLS



Expo To Display The Products Of Mich. Refineries

MT. PLEASANT, Mich., May 27.—A petroleum exposition in Michigan to feature refinery products of the ten oil refineries in the central part of the southern peninsula is being promoted here by the Mt. Pleasant Chamber of Commerce. It will be known as the Michigan Petroleum Exposition and will be held at Island Park, at Mt. Pleasant, July 26 to 31.

This is not to be confused with the Michigan Oil & Gas Exposition held every other year. This being the off-year, the Chamber of Commerce decided to promote an exhibit of made-in-Michigan products used in and for the home, transportation and recreation. It was decided to feature petroleum refining, since the ten central Michigan refineries, with a daily throughput of 25,000 barrels of crude, represent a new and large volume of the state's industries, according to C. L. Maguire, president of the Roosevelt Oil Co. here, and general chairman of the exposition.

Other officers of the exposition are: A. H. Ledbeter, secretary, McClanahan Oil Co., St. Louis, Mich., and J. W. C. McKee, vice-president, Franklin Tool Co., vice-chairman; and H. B. Lidstone, Mt. Pleasant Chamber of Commerce, secretary.

Display space is available in two exposition buildings, and in tents. An attendance of 100,000 is expected.

CURRENT REFINERY OPERATIONS

Districts	Per Cent Capacity Reporting	Daily Average Crude to Stills (Barrels) Week Ended		Per Cent of Reporting Capacity Operated Week Ended		Stocks (Thousands of Barrels) Total Finished and Unfinished Motor Fuel* Week Ended		Stocks of Gas and Fuel Oil Gas Oil and Distillates Week Ended		Residual Fuel Oil Week Ended		Total Week Ended	
		May 28	May 21	May 28	May 21	May 28	May 21	May 28	May 21	May 28	May 21	May 28	May 21
East Coast	100.0	493,000	470,000	73.7	70.3	23,132	22,946	4,000	3,886	6,687	6,824	10,687	10,710
Appalachian	88.4	110,000	108,000	85.3	83.7	3,457	3,346	420	415	976	959	1,396	1,374
Ind., Ill., Ky.	92.4	386,000	420,000	78.9	85.9	14,087	14,384	2,495	2,432	5,660	5,597	8,155	8,029
Okla., Kans., Mo.	84.7	299,000	288,000	78.1	75.2	7,725	7,783	977	967	3,010	2,894	3,987	3,861
Inland Texas	56.6	132,000	144,000	65.7	71.6	2,556	2,616	402	374	1,300	1,300	1,702	1,674
Texas Gulf	95.7	722,000	773,000	90.6	97.0	12,007	12,240	3,314	3,145	6,425	6,012	9,739	9,157
La. Gulf	96.6	139,000	139,000	82.7	82.7	2,529	2,377	1,384	1,469	1,982	2,018	3,366	3,487
No. La., Ark.	63.7	45,000	47,000	77.6	81.0	530	510	174	170	598	578	772	748
Rocky Mt.	69.7	54,000	45,000	87.1	72.6	2,232	2,224	137	133	712	677	849	810
California	90.9	500,000	517,000	67.0	69.3	15,069	**15,097	9,746	9,660	81,186	79,923	90,932	89,583
Total Reporting	89.0	2,880,000	2,951,000	77.8	79.2	83,324	**83,523	23,049	26,651	108,536	106,782	131,585	129,433
Estimated U. S. Total (Bur. of Mines Basis)		3,150,000	3,225,000			87,964	**88,193	23,619	23,211	110,696	108,902	134,315	132,113

*Includes stocks at refineries, in bulk terminals, pipe lines and in transit.
**Revised.

Congress Slashes Road Funds, But Not as Much as FDR Asked

WASHINGTON, May 31. — Congress is expected to adopt a compromise this week on federal-aid highway authorizations for the fiscal years 1940 and 1941 which slashes road funds below present levels but not so deeply as urged by President Roosevelt.

As passed by the House, the road bill called for authorizations of $238,000,000 each of the two fiscal years. This is the level at which authorizations for the current year, for 1939, and for several years past, have been made. This was practically flying in the face of the White House, as the President had recommended $100,000,000 for each year.

The bill, as passed by the Senate, whacked the 1940 authorization down to $128,500,000, and for 1941, to $186,000,000.

The conferees agreed to add $25,000,000 to the fund for regular federal aid for primary roads in 1940, bringing it up to $100,000,000, and to add $5,000,000 to the federal-aid to secondary roads fund for each of the two years, making it $15,000,000 per year. This brings the total authorization for 1940 up to $158,500,000, and for 1941 up to $191,000,000.

Anti-Diversion Provision

Conferees also agreed to strike from the bill the new Section 12 inserted by the Senate, which would have further tightened the penalties for diversion of state motorist fees. This section would have required that the same "percentage" of these funds as were available for highways on June 18, 1934, must be available in order to receive full federal allotments. It was aimed at those states which had added, and might consider adding, another cent or two to the gasoline tax and using the entire proceeds from the tax boost for other purposes than roads.

As a result of its elimination from the bill, the anti-diversion section which has been in force for several years will remain—that is, no motorist funds not authorized to be spent for other purposes than highways on June 18, 1934, may be spent thus subsequently, on penalty of the withholding of one-third of the offending state's apportionment of the road fund for the year in which the diversion occurred.

Another highway development in Washington during the past week has been a series of discussions of a super-toll highway between Washington and New York.

Heads Sales Promotion For Shell Union

NEW YORK, May 28.—Harold L. Curtis has been appointed sales promotion and advertising manager of Shell Union Oil Corp., it is announced by L. T. Kittinger, vice president of marketing. He replaces Fred C. Foy who has resigned to become vice president in charge of eastern sales for Wilding Picture Productions, Inc.

Curtis, who will take up his new duties June 15, has been with the Shell organization for 15 years, lately being manager of the Metropolitan New York division.

Donaldson B. Thorburn will continue as assistant advertising manager. Harry J. Underwood, formerly division manager at Philadelphia, is replacing Curtis as manager of the Metropolitan division.

Will Study Diesel Fuel Taxation

CLEVELAND, May 31. — A study of diesel fuel taxation is to be made by a conference committee appointed by H. P. Leatham, president of the North American Gasoline Tax Conference and state tax commissioner of Utah, according to the American Petroleum Industries Committee.

Members of the committee are: J. D. Hadley, chairman, director of the Michigan Gasoline Tax Division; Dixwell L. Pierce, secretary of the state board of equalization, Sacramento, Cal.; C. S. Holmberg, director of the department of gasoline tax, Chicago; and A. P. Delahunt, American Petroleum Industries Committee, New York.

Builds Refinery Tankage

N. P. N. News Bureau

CHICAGO, May 31.—Sinclair Refining Co. has awarded contracts to Koppers Co. for construction, at its East Chicago refinery, of a water-sealed gas holder with 750,000 cubic feet capacity, a sweating tank, three open-top rundown tanks, and two hot water tanks. Tanks will be welded.

Advertisement

for

The Birth

of

Twins

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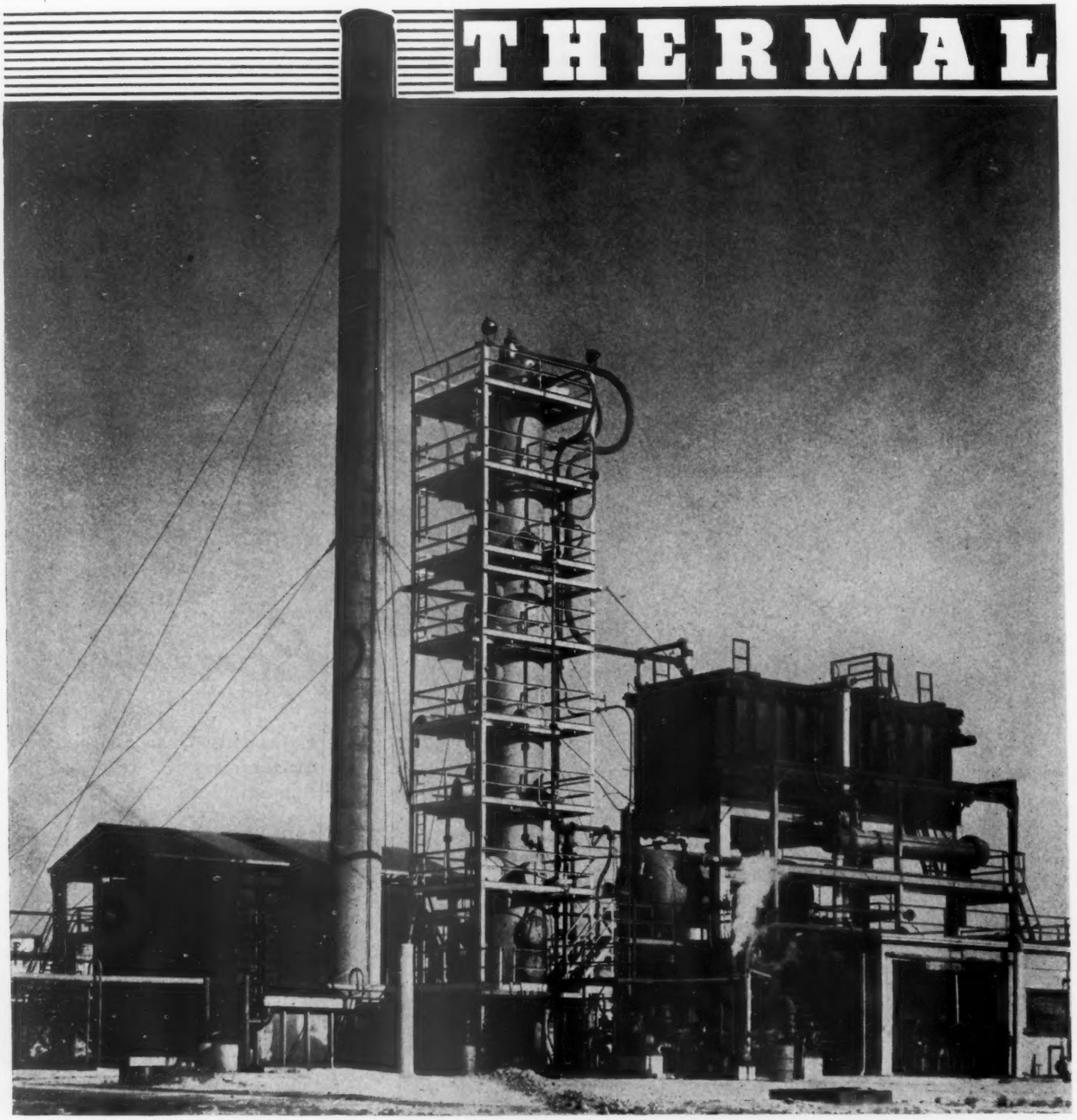
THERMAL



THERMAL POLYMERIZATION AIDS IN MEETING CHANGING ECONOMIC CONDITIONS

Large scale commercial operation of thermal polymerization has proven its ability to widen the range of products profitably obtainable by refiners and natural gas plant operators from saturated and unsaturated gaseous hydrocarbons.

The increased recovery of higher octane motor fuel and other valuable products from the processing of waste gases, or gases now considered of low commercial value, is daily proving the economic advantages of thermal polymerization plants.

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THE POLYMERIZATION PROCESS CORP.

15 Exchange Place **Jersey City, N. J.**

POLYMERIZATION

A center view of the Atlantic Refining Co. polymerization plant at Philadelphia

Poly Unit Cuts Crude Requirements 3 to 4% at Atlantic Refinery

By ARCH L. FOSTER

N. P. N. Technical Editor

ABSTRACT

Polymerization unit has been not only a conservation tool and economic factor in refining but also a factor in increasing operating flexibility of a refinery. Atlantic Refining Co., wanting more capacity and flexibility, found the thermal poly process advantageous and built a plant to charge 22,000,000 cubic feet of refinery gas daily. Yield of the plant is 1850 barrels per day of 76-78 octane number blending naphtha from gases formerly burned as plant fuel. Purchase of 3000 to 3500 barrels of crude per day is saved.

Sulfur is removed from the charge gases by the Koppers phenolate process from which desulfurized gases pass to a feed recovery unit which supplies the charge for the poly plant. Both units are licensed from The Polymerization Process Corp. The details of their operation is described in the accompanying article.

• • •

POLYMERIZATION of refinery and natural gases has been publicized, and justly so, as a conservation tool to increase the yield of motor fuel per barrel of crude, and to improve the octane rating of the finished motor fuel directly because of the high octane number of polymerized gasoline. Practical application of this process to refinery operation has also shown, however, that it is a most important factor in increasing the operating flexibility of a refinery, and that this factor is one of the most important considerations in determining whether or not such a process will be installed.

This latter consideration, flexibility of plant operation, has not been so widely discussed as other phases of the problem of utilizing refinery and natural gases. When, however, it is found by actual plant operation in a modern large-throughput refinery that crude requirement for a given motor fuel production is reduced by three to four per cent, that needs for tetraethyl lead are reduced by a considerably greater percentage, that lead requirements are further reduced by reason of the greater percentage of straight-run naphtha which may be reformed profitably, and the overall plant loss in the form of gases is reduced appreciably, the first-hand importance of polymerization in refining economy becomes decidedly more apparent.

Refiners everywhere are faced with the problems incidental to cost reduction, yield and quality improvement. This is true with respect to lubricants and specialties as well as motor fuels. This is especially true of refiners who produce less crude than they process, and must go into the market for their needs. In recent years gas loss has been one of the most expensive of all losses and one which has been on the increase as severity of cracking operation increased. Faced with the necessity for increasing octane

number a few years ago, the dilemma of the refiner was "which costs least, 'lead' or reforming?" In most cases and with most crudes a balance was reached by many refiners, whereby a given proportion of heavy naphtha was reformed and the remaining octane rating obtained by the use of lead. It is only fair to state that for a large number of refiners the availability and use of lead was a savior, in view of the market prices then prevailing. However, octane ratings have slowly but surely increased during the last five years. A "left-hand" type of market economics has forced the refining industry to raise efficiency of plant operation to a degree never before dreamed off; the severity of plant operating conditions has shortened the effective life of equipment so that whereas a few years ago a five-year amortization period for cracking plants was customary, a two-year period is now more prevalent.

Adverse economics has also made it necessary to utilize crudes which may be less advantageous in natural properties than others which formerly might be chosen for refining. It has been necessary to erect plants in locations more advantageous from the economic viewpoint, where transportation of crude to the plant or of refined products to large consuming centers will show a lower overall cost. It has been necessary to increase the gasoline yield per barrel of crude to the highest practicable point, to reduce the total outlay for crude, to avoid necessity for purchase of more expensive refining capacity. In most cases the expenditure of relatively small sums has made it possible for the refiner to avoid much higher costs for additional crude capacity.

Atlantic Wanted Capacity, Flexibility

Atlantic Refining Co. found itself needing considerably more refining capacity to meet growing sales requirements. It built the new refinery at Atreco, Texas, on the Gulf coast and in easy pipeline reach of the huge East Texas and other fields. It also needed more capacity at Philadelphia, its "home" refinery, in easy reach of the largest consuming centers in the country. It built additional crude and cracking capacity to meet the need.

East Texas crude especially is paraffinic in properties, yielding straight-run gasoline of low octane number, which necessitates reforming or other means of increasing octane rating. Reforming increases gas production, especially in the three and four carbon hydrocarbons and only a small amount of butane, if any, can be used in motor fuels except in winter grades. No propane is usable either summer or winter.

Study of the composition of the refinery gases at Philadelphia showed a large proportion of saturated C_3s and C_4s, propane and butanes which would not be involved in a polymerization system which utilizes only the olefin gases present. For that reason especially Atlantic technologists chose a thermal polymerization process, in order to bring into reaction the largest possible percentages of all gases available.

In short, Atlantic decided on a polymerization unit of the thermal type. The plant was to charge 22,000,000 cubic feet of refinery gases per day. This plant, as well as the feed recovery plant, were designed and built by the M. W. Kellogg Co. under license from The Polymerization Process Corp. Practically 20,000,000 cubic feet of the charge are obtained from the cracking units, storage tanks, topping stills and miscellaneous plant sources. The very rich stabilizer overhead gases amount to some 3,000,000 cubic feet per day, of which 900,000 cubic feet is recycle gas, which is combined with the plant gases from other sources.

From this unit 1850 barrels per day of 76-78 octane number blending naphtha is produced from gases formerly burned as plant fuel. Estimating from the overall average yield of motor fuel normally produced from the total plant throughput this additional gasoline production saves the company the purchase of 3000 to 3500 barrels of crude per day, or a total outlay of around $5000 per day for additional crude charge, delivered at the plant.

Sulfur Removal

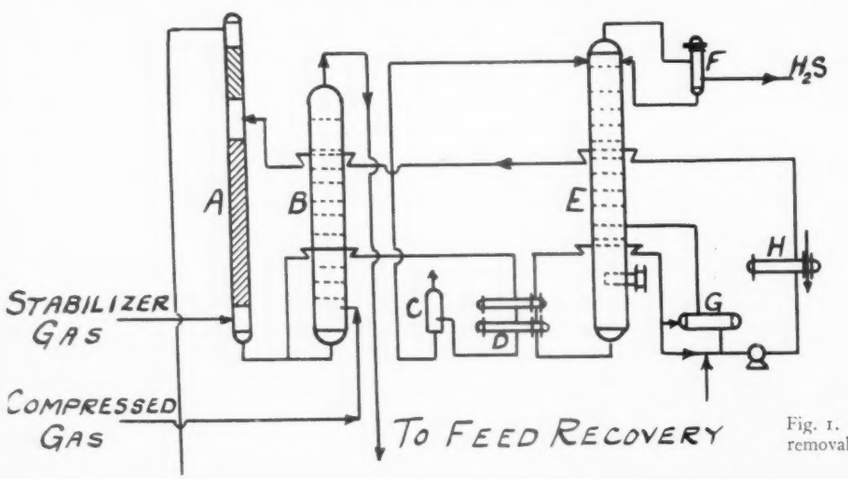
Elimination of practically all sulfur from these charge gases is necessary for three main reasons. The gases contain up to 1000 grains of sulfur as H_2S per 100 cubic feet; this amount of sulfur, a large part of which comes from West Texas crudes, would increase corrosion in the polymerization unit to such a degree that maintenance costs could become prohibitive. Similarly, the resulting blending naphtha would be comparatively very high in sulfur. Its lead susceptibility would be correspondingly lowered. Also, the sulfur so recovered is converted to sulfuric acid for use in the refinery, this source supplying one-third to one-half of the plant's acid requirements.

The Koppers phenolate process was installed. The sulfur is recovered as H_2S in a 95-97% pure condition, operating conditions of the unit being so maintained that a minimum of hydrocarbons is present as contaminant in recovery solution and in the sulfur gases.

Sodium phenolate solution is the removal agent*. This solution is circulated through the system counter-current to gases, at the rate of 3000 to 5000 gallons per hour, the quantity depending on the gas throughput and the sulfur concentration therein. The solution absorbs the sulfur at the lower temperature, at which the acidity of H_2S is greater. As the temperature is increased, the acidity of phenol increases faster than that of H_2S, so that the latter is driven from the solution in the actifier tower E shown in Fig. 1.

The rich stabilizer gases enter the small tower, A, in this figure counter-current to the descending phenolate solution, and are robbed of 95% of their H_2S. The compressed gases from the plant enter the shorter and larger tower, B, for the same treatment. The foul solution from the two towers is combined, passing through the heat exchangers D, the degasser C, and into the top of the actifier tower E. The desulfurized solution is returned to the columns A and B, the sulfur goes overhead from tower E to the acid plant. Desulfurized gases from A tower, after condensation, go to tower I, and those from tower B to tower L of the feed recovery unit, shown in Fig. 2. The

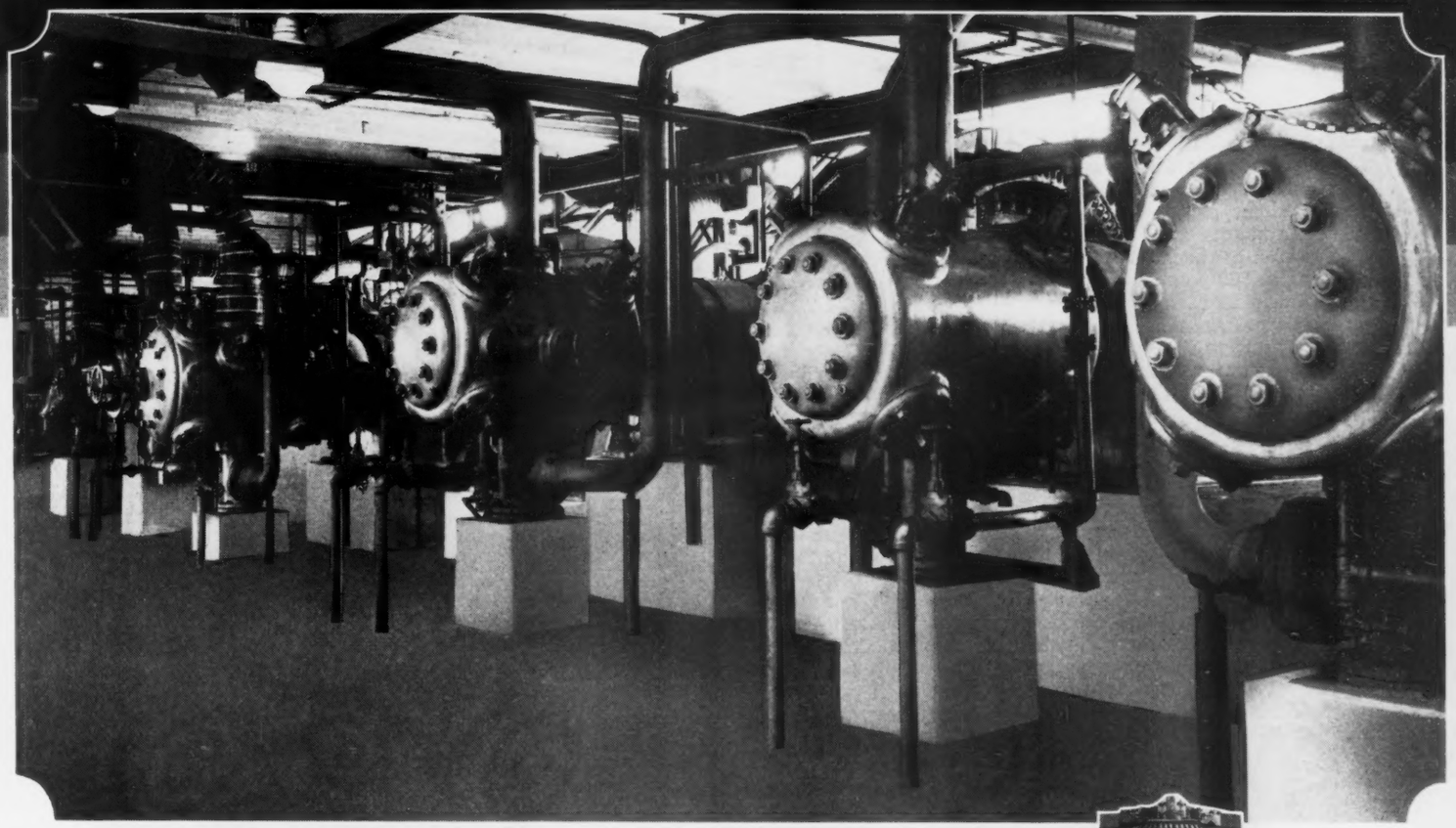
*See Nat. Pet. News, June 16, 1937, page 50, for complete article describing the Koppers Phenolate Process.



A—Kopper's Absorber
B—Kopper's Absorber
C—Kopper's Degasser
D—Exchangers
E—Kopper's Actifier
F—Kopper's Dephlegmator
G—Surge Tank
H—Exchanger

Fig. 1. Flow diagram of the Koppers phenolate plant for sulfur removal. Desulfurized gases from this plant pass to the feed recovery plant

EXPANDERS EXTRACT HORSE-POWER FROM HIGH-PRESSURE RESIDUE



—at Atlantic Point Breeze Poly Plant

Above photograph shows installation of three 500 H.P. CLARK Balanced Opposed Electric Driven Compressors, and one 300 H.P. CLARK Compressor of this type,—at Atlantic Refining Company's new Point Breeze Polymerization Plant.

This installation also includes a CLARK 600 H.P. Twin Engine-Type Expander, and a CLARK 300 H.P. Single Engine-Type Expander.

The Expanders are so arranged that, in the event residue gas pressure should fail, the electric motors mounted between the frames will automatically pick up the compressor load.

For latest engineering information on any compression problem — consult CLARK.

See CLARK Section, 1938 Composite Catalog

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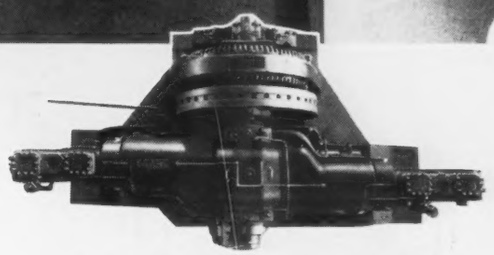
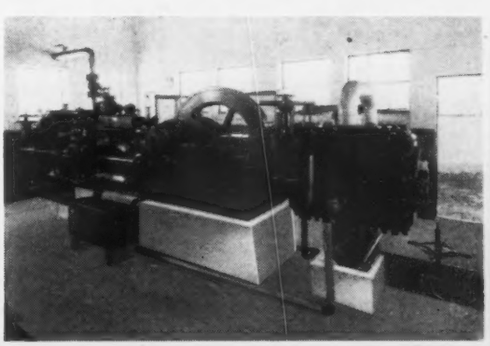


CLARK Horizontal Balanced Opposed Electric-Driven Compressor— Overhead View



CLARK Single Engine-Driven Expander.

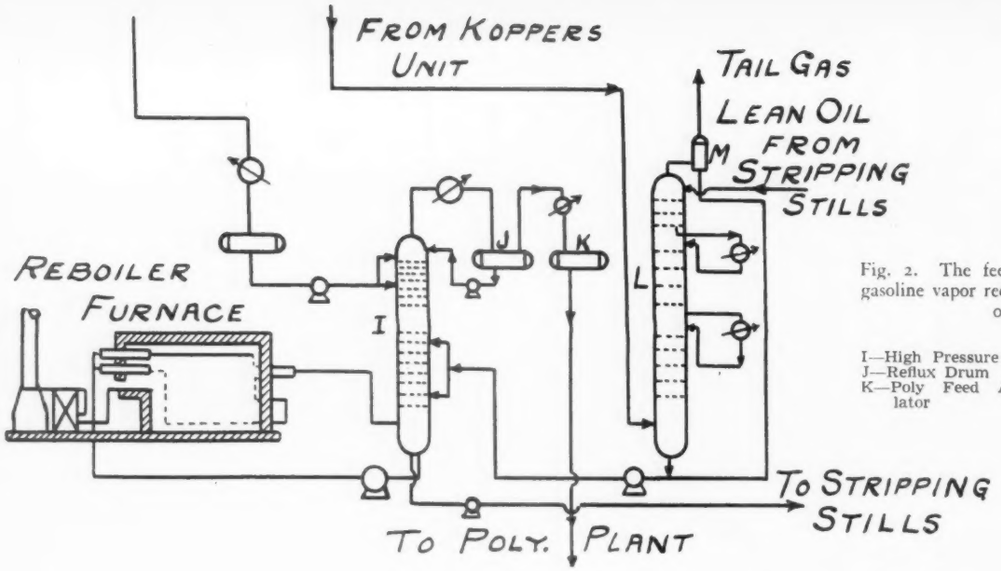


Fig. 2. The feed recovery plant is a combination gasoline vapor recovery unit and a poly feed recovery or concentration unit

I—High Pressure Still
J—Reflux Drum
K—Poly Feed Accumulator
L—Absorber Tower
M—Mist Extractor
N—Primary Fractionating tower

stabilizer gases enter the system containing 200-1000 grains of H_2S per 100 cubic feet, at a pressure of 200 pounds per square inch; the plant gases enter at 210 pounds with a sulfur content of 500-1000 grains per 100 cubic feet. The H_2S gas amounts to 150,000 to 300,000 cubic feet per day.

Tower A of the Koppers unit is 1 foot 8 inches x 43 feet, operating at 200 pounds; tower B is 4 feet x 31 feet, operating at 210 pounds. The actifier tower E is 5 feet x 41½ feet, and operates at 3-10 pounds, with a bottom temperature of 245° F. and top temperature of about 228° F. Centrifugal pumps are used throughout without any special arrangements or alloys being required.

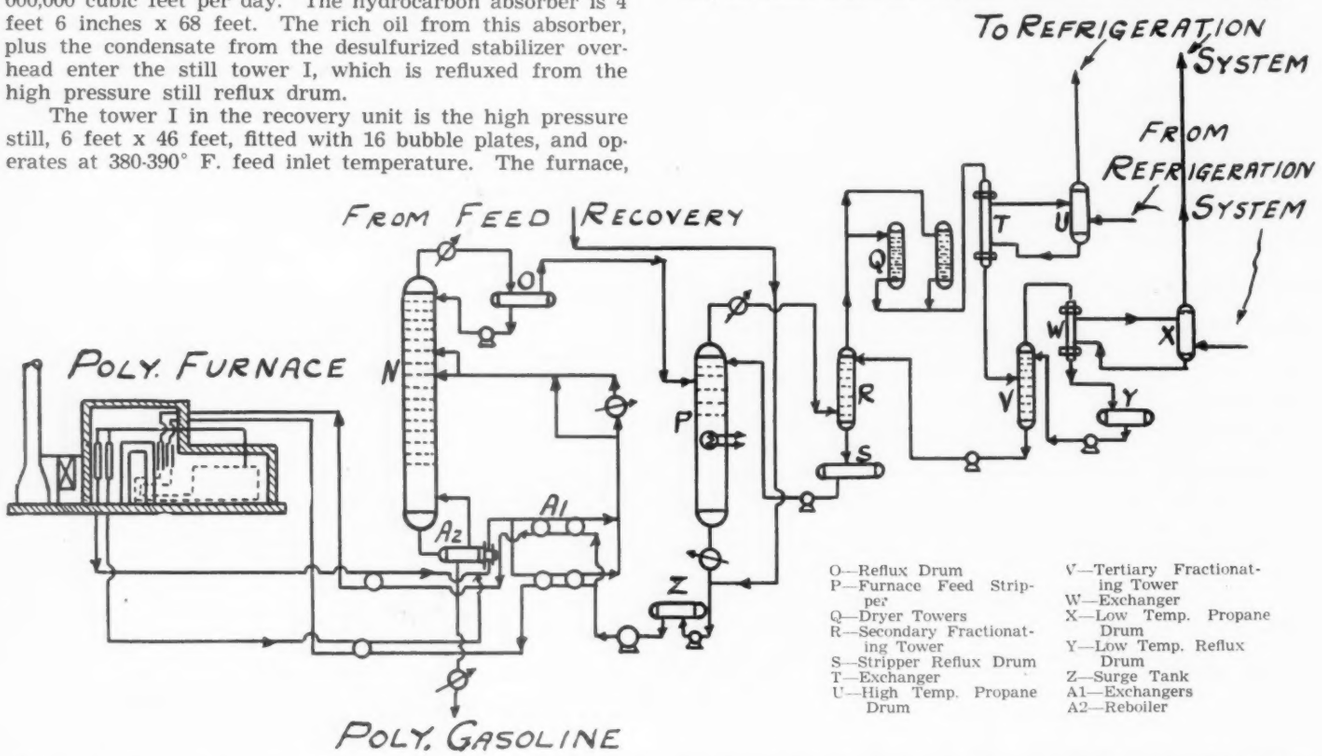
Feed Recovery Unit

This unit is actually a combination gasoline vapor recovery unit and a poly feed recovery or concentration unit. The desulfurized and compressed plant gases enter tower L counter-current to lean absorber oil fed at rate of 40 gallons gas oil per 1000 cubic feet of gas, and the stripped gas goes overhead to the plant fuel system, 11,000,000 cubic feet per day. The hydrocarbon absorber is 4 feet 6 inches x 68 feet. The rich oil from this absorber, plus the condensate from the desulfurized stabilizer overhead enter the still tower I, which is refluxed from the high pressure still reflux drum.

The tower I in the recovery unit is the high pressure still, 6 feet x 46 feet, fitted with 16 bubble plates, and operates at 380-390° F. feed inlet temperature. The furnace, designed for 40,000,000 Btu. per hour heat transfer, receives the fat oil at about 420° F. and sends it to the still at 500° F., handling about 35,000 barrels per day. The overhead from this tower is polymerizer charge, 4500 barrels per day of C_3 and C_4 material, or 8.6 gallons per 1000 cubic feet of gas treated. The bottoms from tower I, heated in the reboiler furnace and stripped, is "semi-rich" oil which goes to another stripper not shown in the figure, removing vapor recovery gasoline and returning lean oil to the absorber L. Absorber oil circulation is up to 21,000 barrels per day in this unit. This recovery step yields 3000 barrels per day of light gasoline, or 5.7 gallons per 1000 cubic feet of gas. This gives a total yield of hydrocarbons of 14.3 gallons per 1000 cubic feet of gas, or a final yield of nearly 5000 barrels per day of recovery and polymerized gasoline.

Polymerizing Unit

The combined feed enters the polymerizer unit shown in Fig. 3 through the surge tank Z, to which is added the recycle stock from the bottom of the furnace feed stripper



O—Reflux Drum
P—Furnace Feed Stripper
Q—Dryer Towers
R—Secondary Fractionating Tower
S—Stripper Reflux Drum
T—Exchanger
U—High Temp. Propane Drum
V—Tertiary Fractionating Tower
W—Exchanger
X—Low Temp. Propane Drum
Y—Low Temp. Reflux Drum
Z—Surge Tank
A1—Exchangers
A2—Reboiler

Fig. 3. The heat exchangers in the transfer line of the polymerization plant have proved to be the greatest means of heat conservation in the entire system. They recirculate 58,000,000 Btu. of heat per hour. Expanding gases during reduction of pressure are put to work in expansion engines to recover 850 horsepower

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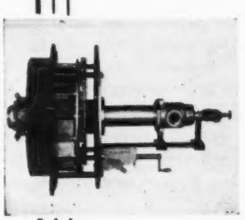
WEBSTER BURNERS

are indicated.

The Webster Engineering Company is proud to be able to say that the Atlantic Refining Co. used Webster equipment on the unit as described in the article, "Poly Unit Cuts Crude Requirements 3 to 4 per cent at Atlantic Refinery", in this issue.

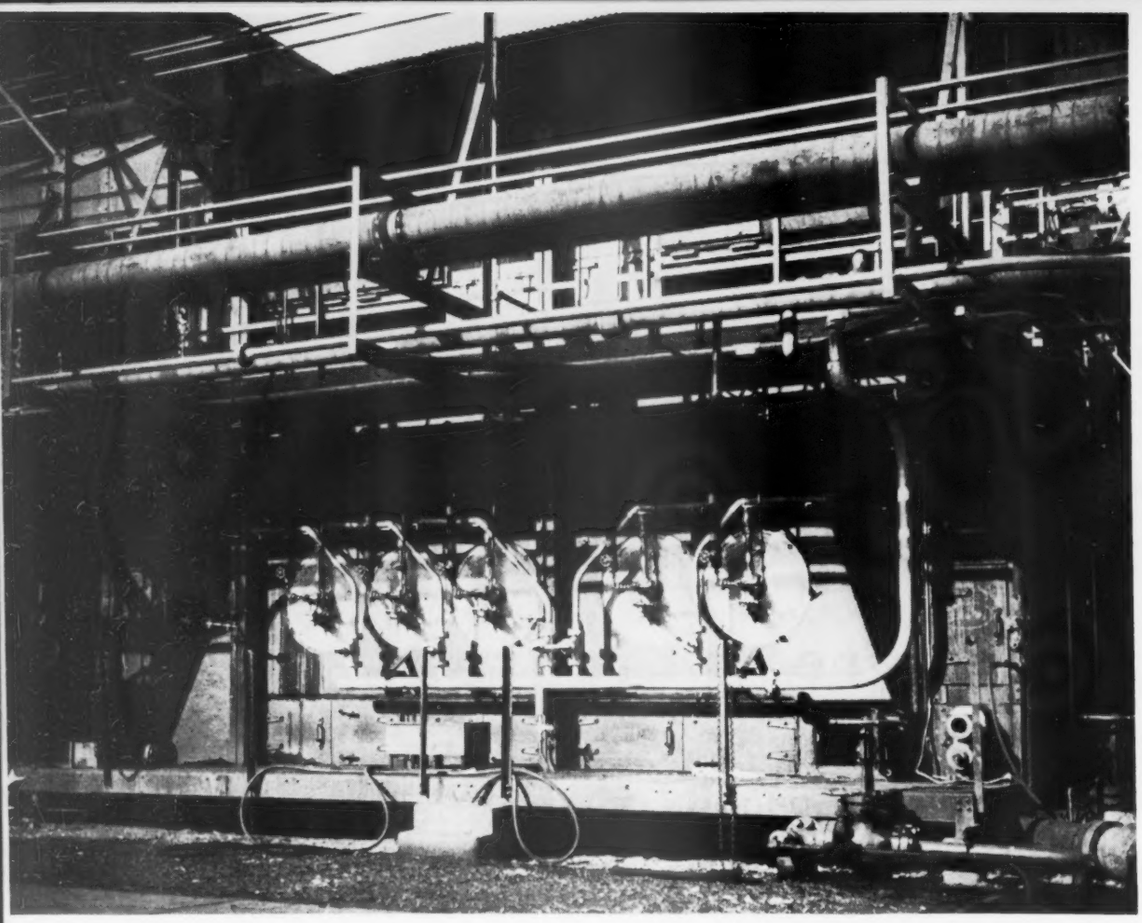


The Webster Engineering Company

Tulsa, Oklahoma

Division of

SURFACE COMBUSTION CORPORATION TOLEDO, OHIO



Firing bank of Webster burners on one end of the polymerizing furnace. Five similar burners are used at the other end of the furnace

tower P. From this tank the charge pump sends it in parallel streams through the transfer line exchangers at a pressure of 2300 pounds, where it is preheated by the polymerizer furnace product on the latter's way to the primary tower N. This pump is a 19-stage Byron-Jackson centrifugal, the greatest number of centrifugal pump stages now in use so far as the writer has been able to ascertain. It is driven direct by a 1250 hp. GE motor working through a fire-wall and stuffing box. A GE steam turbine direct-connected to the pump shaft, or 500 hp., is a standby operating automatically to take up a portion of the load when the pump speed falls below a predetermined rate, and with a small amount of steam bleeding through at all times to keep the turbine hot for instantaneous service when demand arises.

The parallel streams continue through the polymerizing furnace and back through the two pairs of transfer line exchangers AI. Flow rate through each coil and exchanger pair is 870 g.p.m., by design calculations. This furnace uses mainly carbon steel tubes with some low Cr moly alloys; the tubes vary in wall thickness from 5/8 inch to 3/4 inch. Normal throughput is 27,000-28,000 barrels per day including recycle. Entering temperature is 730° F. and outlet 1030° F. The pressure on entering is 1800 pounds with 200 pounds drop through the coils. Ten Webster Engineering burners are used to heat this furnace.

The heat exchangers in the transfer line have proved to be the greatest means of heat conservation in the entire system. They "recirculate" heat to the amount of 58,000,000 Btu. per hour, reducing the load on the furnace to such an extent that the heat transfer capacity of the furnace proper is reduced to less than half what it otherwise would be. With desulfurized charge the corrosion and the maintenance cost on these very heavy duty exchangers is only a small fraction of what it would be with high-sulfur charge.

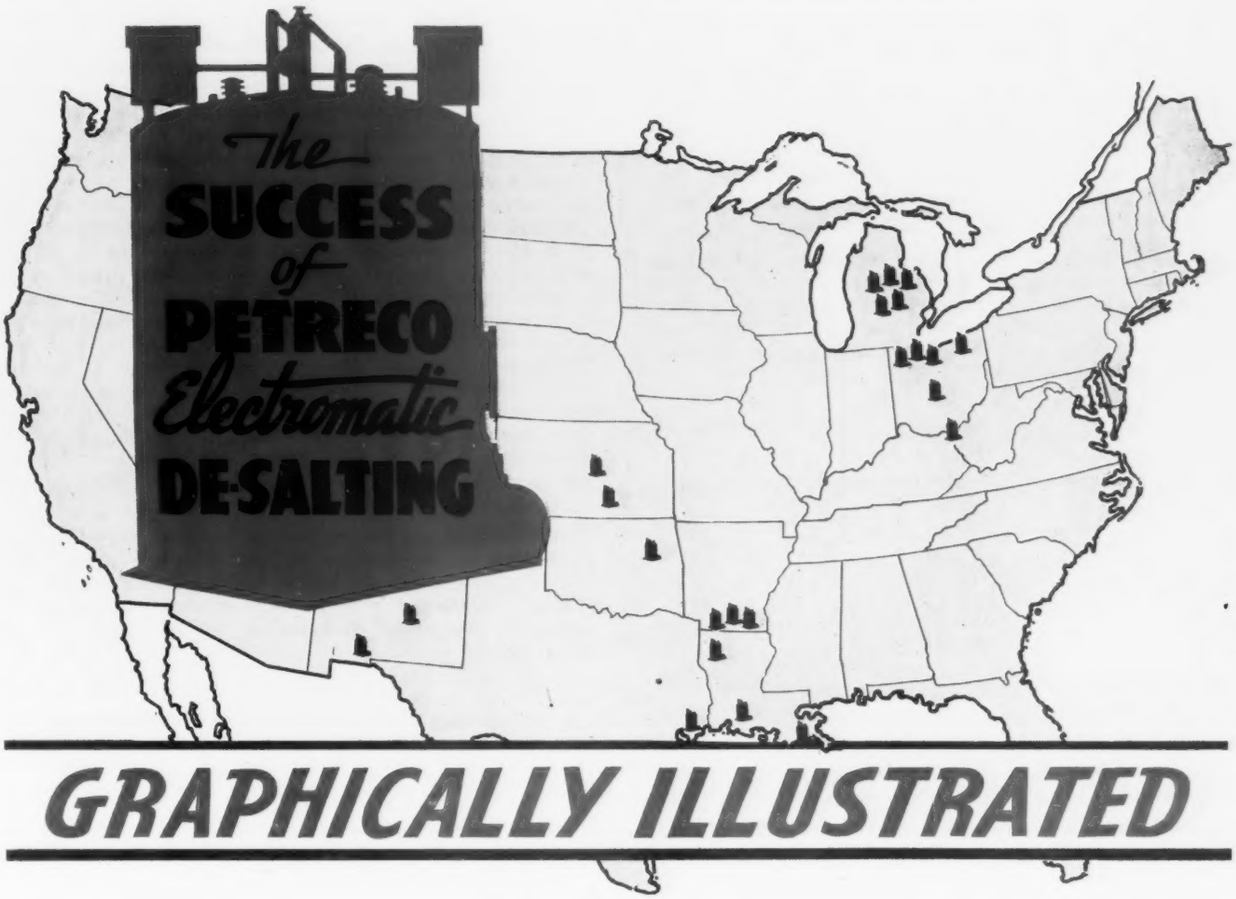
The conversion-polymerization per pass is about 10% by weight in normal operation such as has been established for a considerable length of time. As per-pass conversion is increased by higher temperatures and/or pressures the degradation of the charge increases, more non-condensable gas is lost to tail gas, carbon formation gum, etc. are increased; 10% has been found so far as to be the optimum rate yet obtained for this particular charge.

The polymer product from the bottom of tower N, 1850 barrels per day, is stripped in reboiler A2 by the hot polymer transfer product taken between the two banks of the transfer line exchangers. The polymer then passes out of the unit. This polymer is propane-free from the first tower, from which pentane-free recycle material is taken overhead. This overhead stream enters reflux drum O, thence to the furnace feed stripper tower P, which is refluxed from stripper reflux drum S. The major portion of the C_3 and C_4 content of this stream is here taken from the tower bottom to recycle along with fresh charge through surge tank Z. Overhead from tower P is further fractionated in secondary tower R which is refluxed from low temperature tertiary tower V. Bottoms from tower R are used as reflux in the stripper tower. Overhead from R enters the two dryer towers contacting 9500 pounds of alumina, to remove any traces of water before entering the refrigerating system.

Then, passing through exchanger T, this overhead is chilled by self-refrigerated propane from the refrigerating unit not shown in the figure, and goes to low temperature tertiary tower V for refluxing tower R as mentioned above. Overhead from tower V is chilled in exchanger W with cold propane from drum X. Drum U is used for the same purpose in exchanger T. This propane is chilled by self-evaporation to minus 8° F., and by the use of this somewhat intricate system, practically all C_3 hydrocarbons are recovered for recycle. The evaporated propane in the refrigerating unit is returned to the refrigerating compressor system.

High pressure gas from each unit, for example the 210-pound gas from the absorber of the recovery unit, is used in engines or "expanders" to partially operate three Clark's compressors, and three refrigerators, saving some power cost. Work totaling 600 hp. is recovered by this innovation.

The total gas from the gasoline recovery system is also passed through an expander at 380 pounds and is expanded down to burning line pressure, recovering 250 horsepower. Compressor cylinders are mounted on the work end of



GRAPHICALLY ILLUSTRATED

The rapidly increasing use of the Petreco Electromatic De-Salting Process is graphically illustrated by the installation of a large number of plants, located in eight states throughout the Gulf Coast, Mid-Continent and Great Lakes sections.

These plants, comprising from one to eight units each, are successfully de-salting crudes produced in New Mexico, Texas, Louisiana, Arkansas, Oklahoma, Kansas, Michigan, Ohio, Illinois, and Kentucky; and have definitely proved the many outstanding advantages of the Petreco process for increasing onstream time and substantially reducing refinery operating costs, as well as minimizing corrosion, scaling, and other difficulties resulting from salts in crude charging stocks.

The results accomplished by these plants, together with other important de-salting data, will prove of great value to refiners and are available without cost or obligation.

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these expanders, the compressor cylinders being used to compress propane for the refrigeration recovery system.

The balance of the compressor battery consists of 1000 horsepower in Clark balanced opposed electric driven compressors.

Another novel feature of the compressor installation in this plant is the automatic control on the expander work engines. These units are equipped with synchronous motors. These motors float on a line and in the event that the residue gas pressure should fail, the motors automatically pick up the compressor load.

The total polymer production represents 3.5 gallons per 1000 cubic feet of gas charged. This is a 68.5% yield by weight on the net C_3 and C_4 hydrocarbons in the charge, the remainder going into residue gas as C_2 methane and hydrogen, as shown under "Poly. Tail Gas" in Table 1, with small amounts of propylene and propane.

TABLE 1

Analyses of Gases in Atlantic Polymerization System

Hydrocarbon	Stabilizer tower gas	Plant Gas %	Poly. Feed Gas %	*HC. Absorber Gas %	†Poly. Tail Gas %
Hydrogen	....	....	....	....	4.7
CH_4	....	39.4	2.6	66.5	50.6
C_2	7.5	24.2	19.9	28.4	40.1
C_3	73.7	21.9	61.6	5.1	4.6
C_4	18.8	10.6	15.9	....	....
C_5 and heavier	....	3.9	....	....	....

* 11,000,000 cu. ft./day produced.
† 5,500,000 cu. ft./day produced.

From column 3, Table 1, it is noted that more than 60% of the poly feed recovery is C_3 Hydrocarbons, with about 16% of C_4 hydrocarbons, the remainder being C_2 hydrocarbons and methane. The composition of the recovery gasoline from tower I is as follows as a typical analysis:

	Mol. %
C_4	59.0
C_5s	33.0
Heavier	8.0
Total	100.0

The distillation range and other properties of the polymer product are shown in Table 2.

TABLE 2

Distillation and Properties of Finished Polymer

ASTM Distillation

% Evap.	Temp., °F.
Init. B. P.	92
5%	114
10	123
20	137
30	147
40	156
50	167
60	178
70	191
80	218
90	269
95	348
Dry	407

API gravity	69.0
Sulfur	0.0540
R. V. P.	11.5
Mol. Wt.	90
Octane No., polymer	76.
Blending O. N. value	84.

The polymer product is subsequently processed in Gray towers to improve color and gum. Conventional doctor sweetening is the final step used in refining this material.

Possible Problems in Operating Polymerization Unit

The operation of a polymerizing unit, which has occupied the attention of so many refiners under a wide variation of conditions during recent years, has brought to light a number of the problems which may be faced in greater or less degree by the operator. Solution of these problems have been worked out in most cases quite satisfactorily. The method of solution may and will doubtless vary in each individual case; it may be of interest here to point out some of the problems which refiners have met in this type of operation.

One of these problems is that of the formation of asphaltic materials in the polymerization step. In any reaction such as polymerization under heat and pressure the reactions cannot be completely confined to the one desirable step, that of combining two molecules of three or four carbon atoms to form one of six, seven or eight molecules. A very small percentage will go on to more complex reactions; a small amount of excessive cracking will occur with the result that small amounts of tarry or asphaltic material are produced, even in a polymerizing unit where such occurs to a much lesser degree than in the best of cracking operations. In handling such materials, the presence of reacted propane or butane—a conversion of 10% per pass is considered good in thermal operations—may precipitate such heavy materials in exchangers or towers, with a clogging effect. The solution of this problem is an individual one in each plant; a high velocity of the liquid through exchangers for example is good practice. Through the heavy duty exchangers of the Atlantic unit the liquid passes at a calculated velocity of 224 feet per second, or 153 miles per hour, giving a strong sweeping or scouring action to maintain clean tubes.

On centrifugal hot oil pumps handling very light materials such as polymerizer charge, the problem of wear in the rotor may arise. When handling gas oil or heavy stocks the charge will have somewhat the effect of a lubricant, preventing or reducing wear on the moving or rubbed parts. Gland oils used in packing glands where suction instead of pressure on the packing gland is maintained, may be permitted to mingle with the charge without detriment. When handling light materials the lubricant action of the stock is almost wholly absent, while gland oil must not mix with charge to any appreciable degree. This situation may necessitate the use of a special oil for gland sealing and lubrication.

In using gases containing small amounts of condensable hydrocarbons, entrainment of liquefied material has sometime offered difficulties. The writer remembers the use of high pressure gas from the old Monroe, La., field lines to power all prime movers in carbon black plants. This gas was practically dry and offered little difficulty from liquid entrainment. When entrained material is encountered, the problem may be solved by mechanical changes in the prime movers, to obviate the trouble.

Sulfur removal is considered absolutely essential when the percentage is appreciable, to reduce corrosion-erosion troubles. A combination of corrosion from sulfur or other source, combined with high liquid velocity and rapid direction changes will produce a film of corroded metal which is immediately removed to permit further corrosion. Instances are on record where hemispherical holes have been produced in the heads of pipe exchangers, against which hot liquid impinges in reversing direction, as though cut out with a huge drill bit. Reduction of corrosion through removal of corrosive constituents correspondingly reduces these corrosion-erosion troubles.

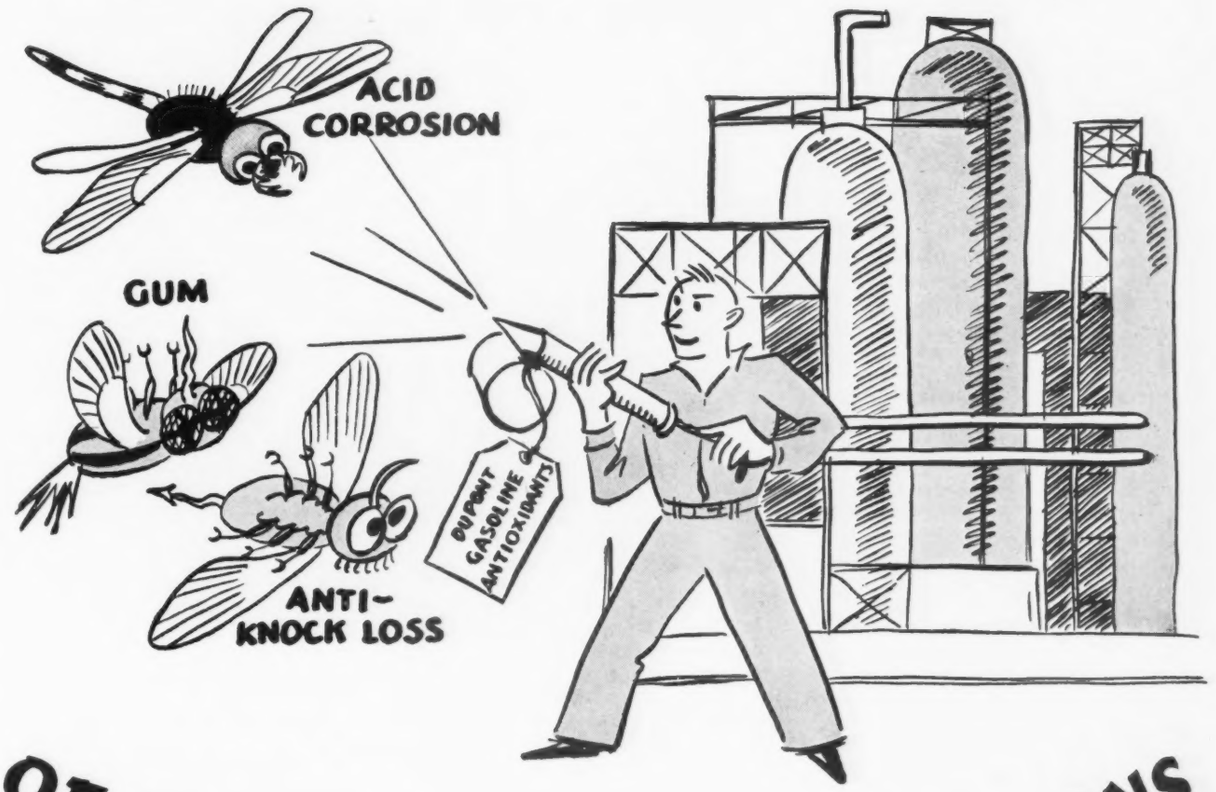
Another possible trouble which has been experienced by polymerization unit and cracking unit operators is in testing for leaks in high pressure tubular exchangers such as double-pipe exchangers. For example, when testing the outer pipe, with water pressure in the annular space between inner and outer pipes, the pressure on the empty inner pipe may become comparatively enormous, since this pipe is made purposely thin to speed up heat transfer rates. Solving this matter by maintaining a comparable pressure within the smaller pipe while testing the outer one is one of the methods mentioned.

TABLE 3

Inspection of Absorber Oil

API Gravity	35-45
Init. B. P.	280-310 °F.
10%	320-340
50%	370-400
90%	420-460

KEEP THE "BUGS" OUT



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GASOLINE ANTIOXIDANTS

35 Tons H_2SO_4 Per Day From Refinery Gases†

By G. M. CARVLIN*

ABSTRACT

Sodium phenolate solutions remove hydrogen sulfide from liquids and gases in a process based on the principle of the differing acidities of the sulfide and phenol at different temperatures. The sulfide is absorbed in the solution at lower temperatures and is expelled therefrom by raising the temperature.

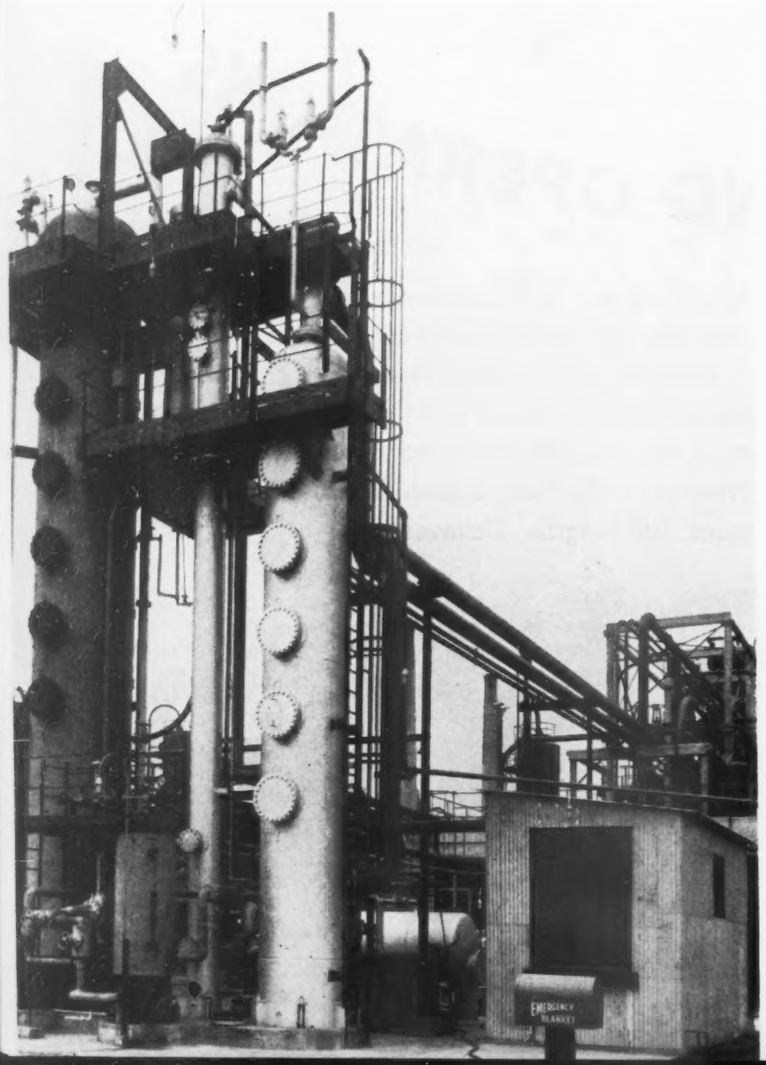
35 tons of 66° Be. acid, valued at $167, is produced per day at an operating cost of $3.25 per ton and 95% of the sulfide in the gas is removed in one plant. The sulfide is converted to acid in a "purification type" contact plant in which vanadium or platinum is used as catalyst and the gas is completely dried before conversion.

Plants of this type now installed have a gas capacity of 55,000,000 cu. ft. of gas per day and can produce 75,000 tons of acid per year.

THE ideal liquid for absorbing an acidic gas such as hydrogen sulfide is obviously a strongly-alkaline solution; and, consequently, sodium-hydroxide solutions have long been used for the purpose. It is well recognized, however, that regeneration of the resultant sodium-hydrosulfide solution is not economically feasible due to the huge quantities of steam or other energy input required. This energy requirement may be brought within reasonable limits by adding to the caustic solution an auxiliary acidic constituent which has an acidity less than that of hydrogen sulfide at normal temperatures. A great many acids meet the condition, but there is another very important condition to be met that distinctly limits the number of acidic compounds available.

Unfortunately, hydrogen sulfide has the property of increasing in acidity with temperature, so that it tends to be held more firmly by the sodium hydroxide at the boiling temperature — and it is a necessary function of the auxiliary acidic constituent to overcome this tendency. This can be accomplished by using an acid which will increase in acidity with temperature rise at about the same rate as the hydrogen sulfide. Under these conditions, the auxiliary acidic constituent will tend to "crowd out" the hydrogen sulfide on actification at the boiling temperature.

Absorbers, actifier, and degasser in a sulfide removal plant



The above desirable conditions are admirably met by certain phenols as shown by the fact that the electrolytic dissociation constant of phenol is 1.3×10^{-10}, while that of hydrogen sulfide is 5.7×10^{-8}. This shows that the phenol is a considerably weaker acid than hydrogen sulfide at normal absorption temperatures, and thereby satisfies the first condition named above. Furthermore, the increase in acidity of phenol with temperature rise is almost exactly the same as that of hydrogen sulfide, as shown by the fact that the molecular heat of electrolytic dissociation of phenol is —6100 calories, while that of hydrogen sulfide is —6060 calories. Thus it may be seen that the use of sodium-phenolate solution for gas purification is theoretically sound, and that the following reaction is readily reversible within the limits required in practical application:

$$NaOC_6H_5 + H_2S \rightleftarrows NaHS + C_6H_5OH$$

Application of Theory to Design of Plants

The use of a solution, containing in combination an absorption agent and an auxiliary acidic constituent as described above, permits a wide flexibility in the choice of solution for any given set of operating conditions. For example, if the gas contains only a small amount of hydrogen sulfide, and a very high degree of removal is desired, the solution selected will be one containing a fairly low concentration of caustic and proportionately high concentration of phenol in order that the solution entering

*The Koppers Co., Pittsburgh, Pa.

†Condensed slightly from paper "Use of Sodium Phenolate for Hydrogen Sulfide Removal", presented before Amer. Pet. Inst., Wichita, Kansas, May 23-25, 1938.

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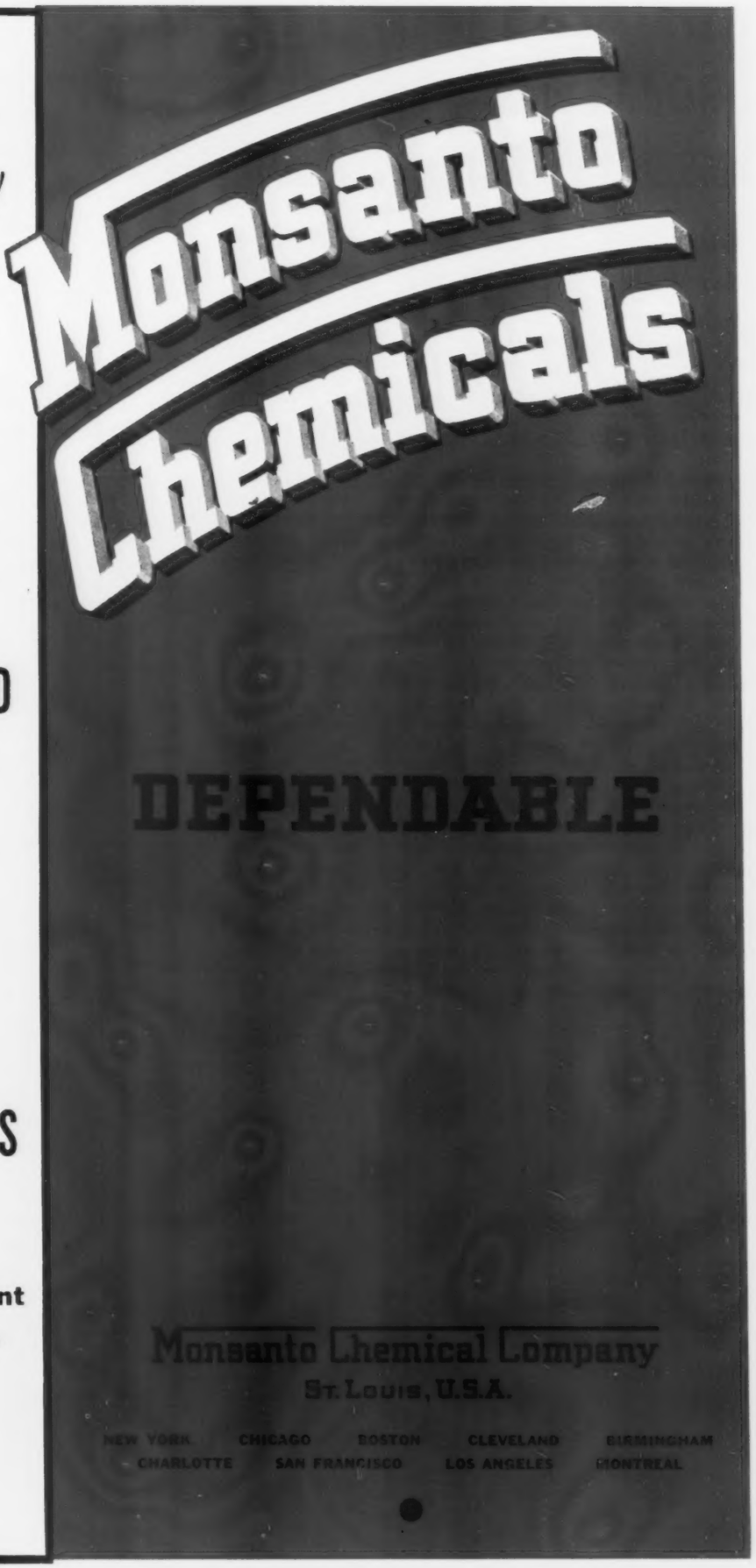

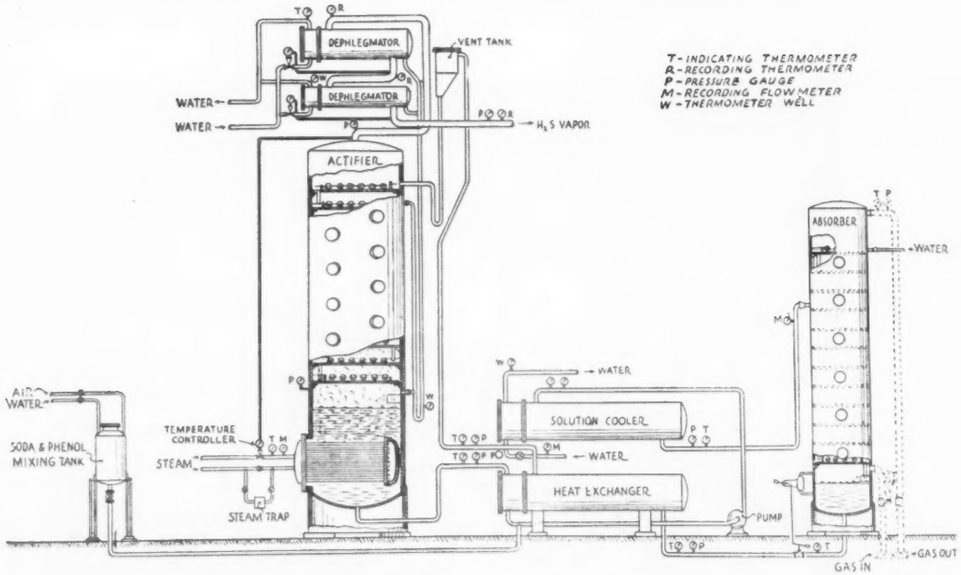

Fig. 1. Flow chart of a single-stage phenolate for H_2S removal

the absorber will be actified to the low hydrogen-sulfide equilibrium required. On the other hand, if the gas contains a high concentration of hydrogen sulfide and the primary object is to recover sulfur, the solution selected will contain a comparatively high concentration of caustic with a low ratio of phenol to caustic.

The Koppers two-stage phenolate process has been developed to effect the maximum steam economy in instances where large quantities of sulfur are to be removed, and where the steam or other heat consumption is a vital item in the operating expense. The two-stage process is recommended also in cases where virtually complete removal of hydrogen sulfide is required.

Fig. 3 is a chart showing the relations between partial pressures of hydrogen sulfide and the hydrogen-sulfide content of the solution under the conditions existing in the absorption and actification stages for both the single-stage and the two-stage systems. This chart is based on a set of operating conditions which is fairly typical of refinery-gas purification. The gas to be purified contains 6000 grains of hydrogen sulfide per 100 cu. ft., and the exit gas contains 80 grains per 100 cu. ft. measured at the actual pressure existing in the absorber. The solution used in this case contains 4 moles of sodium hydroxide and 2.5 moles of phenol per liter. Curve **AB** in Fig. 3 represents the vapor pressure of dissolved hydrogen sulfide over this solution at 25° C. Curve **CD** represents the vapor pressure of the solution at its boiling point.

In the specific example which we have taken, the hydrogen-sulfide content of the actified solution in equilibrium with the exit gas is 3800 grains per gallon, and that of the foul solution in equilibrium with the entering gas is 7460 grains per gallon. The vapor pressure of hydrogen sulfide in phenolate solutions does not follow Henry's law; and, as a result, the vapor-pressure curves are strongly bowed. Actual operating conditions are illustrated by straight lines on the chart. Thus the dotted line **FH** shows the operation of the single-stage absorber, point **F** corresponding to the hydrogen-sulfide content of gas leaving the absorber, and of actified solution in equilibrium with it. Point **H** corresponds to the hydrogen-sulfide content of gas entering the absorber, and of solution in equilibrium with it.

Operation of the primary absorber of the two-stage system is illustrated by the line **GH**, the point **G** corresponding to the hydrogen-sulfide content of the solution entering the primary absorber and the hydrogen-sulfide content of the gas leaving the primary absorber. The line **FG** illustrates the operation of the secondary absorber of the two-stage system.

Slopes of the operating lines (**FH, FG,** and **GH**) de-

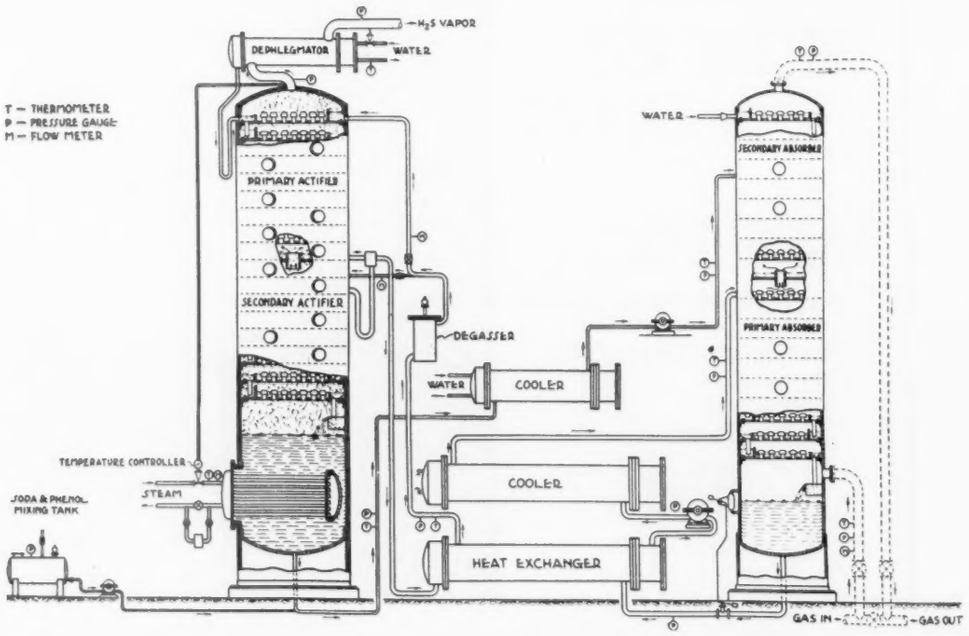

Fig. 2. A two-stage phenolate process flow chart

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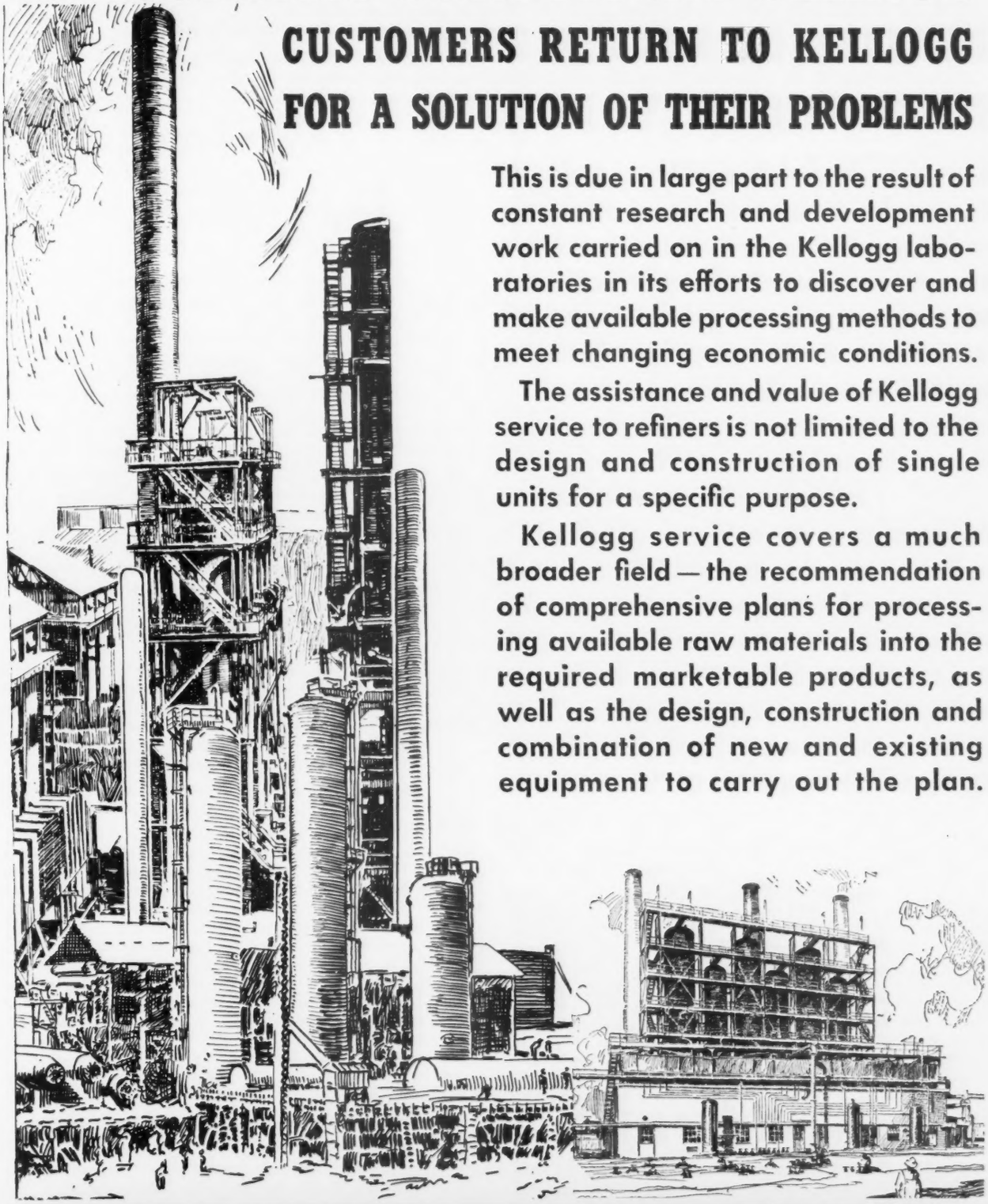

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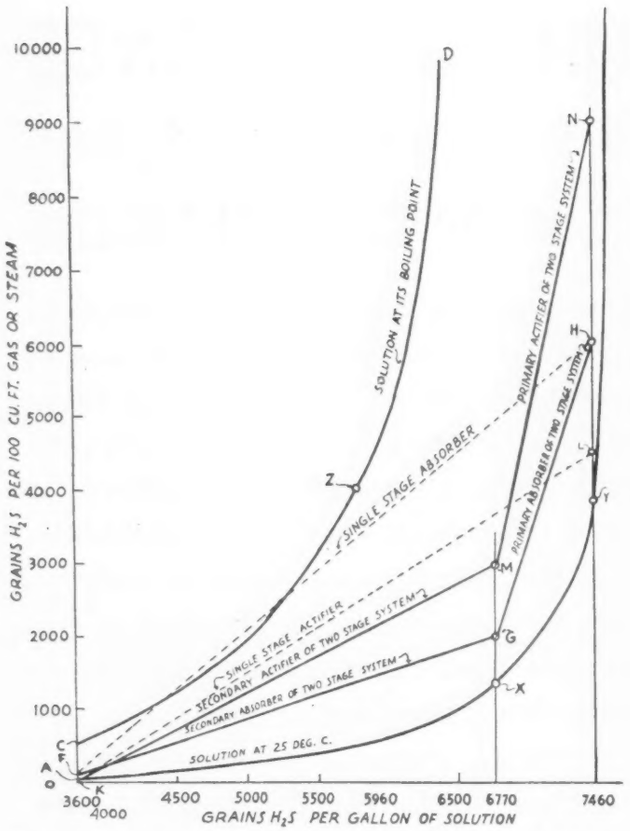

Fig. 3. These curves show the relationships between the partial pressures of hydrogen sulfide and the hydrogen sulfide content of phenolate solution

termine the ratio of solution to gas required in the absorber for the single- and two-stage systems. The slope of the line **FG,** which is comparatively flat, corresponds to the low rate of re-circulation in the secondary system; while the slope of the line **GH,** which is quite steep, corresponds to a much higher rate of re-circulation in the primary system. The solution circulation rate indicated by the line **FH** for the single-stage absorber lies between the rates for the primary and secondary absorbers in the two-stage system.

The principal advantage of the two-stage system may be seen from a study of the operating lines for the actifiers. The line **KL** represents the operation of the single-stage actifier, showing actification of the solution from a concentration of 7460 grains of hydrogen sulfide per gallon to 3800 grains per gallon. The slope of this operating line is comparatively flat, and the distance between **KL** and the curve **CD** increases rapidly as the concentration of hydrogen sulfide in the solution increases. This characteristic limits the steam economy of the single-stage system, and it may readily be seen that the addition of a second actification stage causes the operating curve of the actifier to approach more closely the vapor-pressure curve of the boiling solution. If several stages of actification were used, a corresponding number of operating lines joining at various angles would result — and a still closer approach to the curve representing the vapor pressure of the solution would be effected.

Inasmuch as the slope of the line **MN** is much steeper than that of the line **KM,** it follows that the steam required for actification per gallon of solution in the primary actification stage is very much less than the steam required per gallon in the lower- or secondary-stage actifier section. Consequently, the rate of solution circulation of the primary system is relatively high, and the steam required for actification per gallon of solution is relatively low as compared to the secondary system. Inasmuch as the steam employed in the secondary actifier is later used in the primary actifier, and inasmuch as the two systems are in balance as regards steam requirement, the net result is to lower the total steam consumption for the plant very materially.

Method of Operation

Operation of the single- and two-stage phenolate systems is illustrated by flow diagrams in Fig. 1 and 2, respectively. The single-stage system comprises a continuous cyclic operation, similar to the familiar system used for absorption and recovery of gasoline from natural gas. Gas enters the bubble-tray absorber at the base, and leaves at the top after passing through a series of bubble-cap trays countercurrent to the flow of actified phenolate solution which enters the column on the fourth tray from the top. A very small volume of fresh water is introduced continuously on the top tray to scrub out and return to the solution any chemicals entrained in the gas. The foul solution is forced by the gas pressure from the reservoir in the base of the absorber through the heat exchanger to the top of the actifier column. The solution flows down the actifier countercurrent to a stream of steam which is released from the solution itself by the reboiler in the base of the column. The actified solution flows by gravity through the heat exchanger to the suction of the circulating pump, which forces it through a tubular cooler, and thence to the inlet of the absorber — where the cycle again begins.

Hydrogen sulfide released in the actifier passes through the dephlegmator, where the accompanying water vapor is condensed and returned to the actifier column. The hydrogen sulfide, having a purity of 95% to 99% (exclusive of water vapor) then passes on to the acid-plant burner or other point of disposal. The dephlegmator in this diagram contains two sections, and this is recommended as a measure for conserving water only in cases where large quantities of hydrogen sulfide are produced.

The functioning of the plant is almost entirely automatic. Steam to the reboiler is controlled automatically by the temperature of the vapors leaving the actifier. Water to the dephlegmator is controlled by the temperature of the vapor leaving the dephlegmator. It is necessary to add phenol only at intervals of several weeks.

The operation of the two-stage system differs from the single-stage operation, as outlined above, in the following particulars:

The major portion of the solution is withdrawn from the actifier about midway of the column, and is introduced into the absorber about half way down the column after passing through the heat exchanger and cooler. The minor part of the solution continues down to the base of the actifier, and in the course of this travel is contacted with a proportionately large amount of fairly clean steam. This small volume of highly-actified solution is pumped through a cooler to the upper section of the absorber. After flowing through the secondary absorber, this solution joins the main body of solution in the primary absorber, and the entire volume of solution is forced by the gas pressure through the heat exchanger to the top of the actifier column.

Phenolate Plants Operating on Refinery Gas

A phenolate plant built by the Koppers company for a large refinery on the Pacific coast has a capacity of 16,500,000 cu. ft. of gas per day containing 4 to 5% of hydrogen sulfide (2500 to 3200 grains per 100 cu. ft.). The recovery of sulfur at capacity operation amounts to 35 tons per day. The recovered hydrogen sulfide is forced by actifier pressure through a pipe line over a mile long to a contact-type sulfuric-acid plant, where it is converted to sulfuric acid. The absorbers are handling separate streams of gas at pressures of 5 lb. and 150 lb.

A novel feature of design is a gas-tight steel enclosure around the towers and tubular equipment. This housing was specified by the purchaser as a safety fea-

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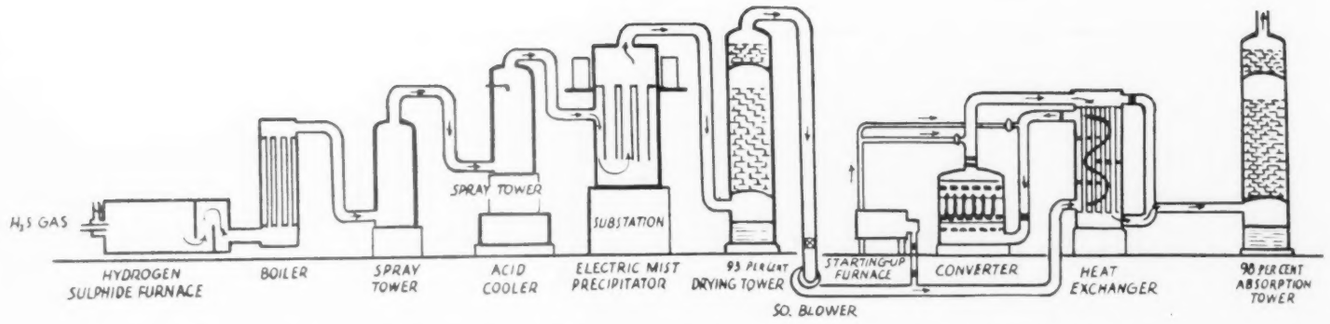


Fig. 4. Diagrammatic "purification type" of contact acid plant, as used for converting H_2S to sulfuric acid

ture to eliminate possible hazards from the toxic hydrogen sulfide, in the event of rupture of the vessels or piping.

A phenolate plant in a large eastern refinery is shown on p. R-268. This plant has a capacity to purify 23,000,000 cu. ft. per day of refinery gas containing about 1½% hydrogen sulfide (1000 grains per 100 cu. ft.). The gas is treated at a pressure of 225 lb. in two separate streams, and at a temperature of approximately 125° F. Hydrogen sulfide recovered in this plant is also piped a distance of approximately one mile to a contact-type acid plant, where it is converted to sulfuric acid for use in the refinery. In contrast to the plant described above, all equipment here is out of doors.

The primary purpose of this installation is to remove 95% of the hydrogen sulfide from gas which is to be fed to a polymerization plant, and the recovery and utilization of the sulfur are of secondary importance.

Phenolate-type plants now in operation have an aggregate capacity to purify 55,000,000 cu. ft. of gas per day. Total sulfur-recovery capacity of these plants is 26,000 tons per year, corresponding to approximately 75,000 tons of 66°-Baume acid.

Sulfuric-Acid Production Cost

The accompanying table shows the cost of producing sulfuric acid from hydrogen sulfide in a fairly typical refinery gas. The gas contains 1000 grains of hydrogen sulfide per 100 cu. ft., and is purified at approximately 100° F. No particular pressure is specified, inasmuch as the operating costs are not seriously affected by the pressure in the absorption stage. Obviously, the pressure of the gas does have a material influence on the size of the equipment and, consequently, on the cost of the plant.

Daily Material Balance

Gas treated, cu. ft.	20,000,000
Pressure, lb. per sq. in.	100
Temperature, deg. C.	25
Hydrogen-sulfide concentration, grains per 100 cu. ft.	1,000
Hydrogen sulfide recovered (95% removal), tons	13.6
Sulfur equivalent, tons	12.8
100% sulfuric acid produced (95% conversion), tons	37.2
Sulfuric acid (66° Baume) produced, tons	34.6
Value of acid (66° Baume) at $13.50 per ton	$467.10

Aggregate Daily Operating Cost for Purification and Acid Plant

Labor: one man, 24 hours at $.80	$19.20
Laboratory and supervision	5.00
Steam: 180,000 lb. at $.20	36.00
Power: 2400 kwh. at $.005	12.00
Water: 790,000 gal. at $.015	11.90
Phenol: 90 lb. crude tar acid at $.10	9.00
Supplies	3.50
Maintenance	15.00
	$111.60
Operating cost per ton of acid (66° Baume)	$3.25
Net return before fixed charges	$355.50
Annual return before fixed charges (350-day year)	$126,000
Annual return on investment (approximate), per cent	50

It is apparent that the largest single item of operating cost is that for steam to actify the solution. A large part of the required steam may be recovered in the acid plant from heat of combustion of the hydrogen sulfide when the volume of hydrogen sulfide burned is sufficient to justify the expenditure for a waste heat boiler. (Hydrogen sulfide has a calorific value of 655 Btu. per cubic foot.) In cases where fuel gas is relatively cheap as compared to steam, a gas-fired reboiler may be used in the actification stage. This has been done on one natural-gas purification plant where no steam-generating equipment was available.

Sulfuric-Acid Plant Operation

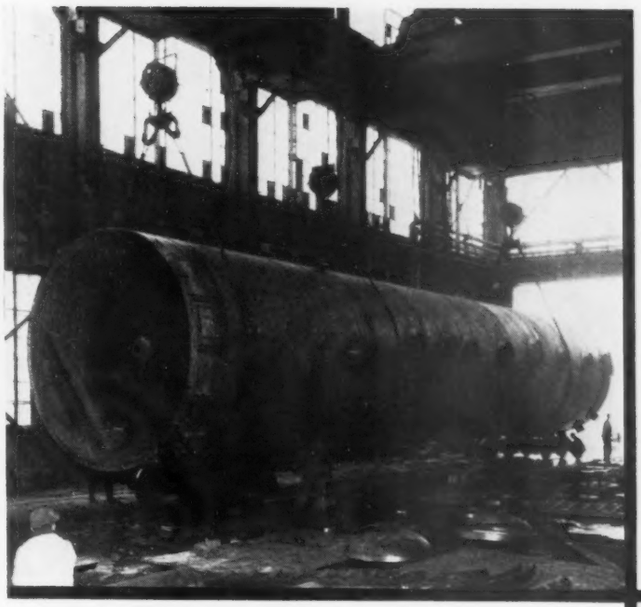
Hydrogen-sulfide gas from the phenolate-plant actifier will be saturated with water vapor at cooling-water temperature, and will contain from 1% to 4% of impurities in the form of carbon dioxide and hydrocarbons. Incidentally, the phenolate process is very highly selective toward the absorption of hydrogen sulfide from gases containing hydrogen sulfide and carbon dioxide, so that the amount of carbon dioxide contaminating the recovered hydrogen sulfide is slight in comparison to contamination encountered in other sulfur-recovery processes.

Water vapor present in the hydrogen sulfide and water formed in its combustion necessitate the use of a so-called "purification-type" acid plant, inasmuch as the sulfur dioxide entering the converter must be bone dry for American acid plants. Fig. 4 illustrates the flow of materials through the "purification-type" contact acid plant. Hydrogen sulfide is burned in a refractory-lined burner, and the combustion products (mixed with secondary air in an amount necessary to provide the proper ratio of sulfur to oxygen) pass through a waste heat boiler to a cooling tower — where the gases are cooled by water or weak acid in a closed circulation system.

The cooled gases pass through a Cottrell precipitator or coke filter, to eliminate entrained mist, into a drying tower — where they are scrubbed with 98% sulfuric acid. The bone-dry gases are then forced by a blower through a heat exchanger and into the converter. Here the hot gas passes through the vanadium or platinum mass, and the sulfur dioxide is converted to sulfur trioxide. After the converter, the gases exchange heat with the cold incoming gases, and enter the final absorbing tower—where the sulfur trioxide is absorbed in 98% acid. The final product is removed from this circulation system, and it may be converted to weaker acid or to oleum by brief additional processing. The inert gases, consisting of nitrogen, carbon dioxide, oxygen, and traces of sulfur dioxide, are released to the air through a stack on top of the absorber. Normal conversion efficiency from hydrogen sulfide to sulfuric acid is about 95% of stoichiometric equivalent.

Correction

Illustrations of polymerization plants on pages R-237 and R-238, May 18, 1938, are reversed. Furnaces of the Thermal Polymerization plant of Phillips Petroleum Co. at Borger, Texas, are shown on page R-238 and illustration on page R-237 is of a polymerization plant now operating in a refinery located on the Texas gulf coast.



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Sulfide Removal With Organic Amines A Flexible Process

By W. R. Wood* and B. D. Storrs*

(Presented before the American Petroleum Inst., Wichita, Kansas, May 23-25, 1938, under the title, "The Girbotol Purification Process").

ABSTRACT

Solutions of the various amines, such as the ethanolamines, derivatives of ammonia, remove hydrogen sulfide from gases, and the sulfide is removed from the solution by heating it to its boiling point. The solutions are non-corrosive, and no special alloys are required for equipment.

If dehydration is also desired, a dehydrating agent, such as diethylene glycol, may be used as the solvent, and the absorbed water eliminated from the system.

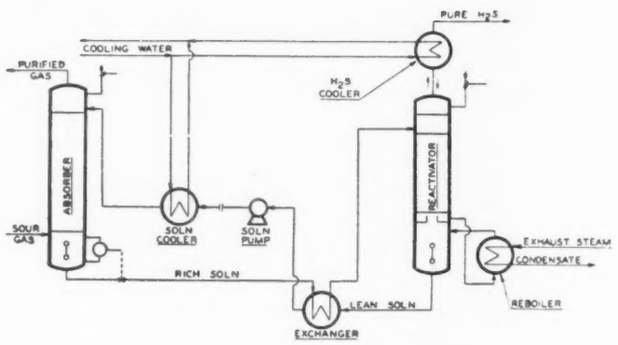


Fig. 1. Flow chart of the Girbotol process, by which water vapors, hydrogen sulfide and carbon dioxide may be removed efficiently from hydrocarbon gases

REMOVAL of hydrogen sulfide from hydrocarbon gases is a process of growing importance at the present time. In the refinery field, polymerization, the production of liquefied hydrocarbon gases, the synthesis of *iso*octane, hydrogen, and various organic chemicals such as the aliphatic alcohols, all are improved by the use of sulfur-free starting materials. In some instances catalysts are injured by hydrogen sulfide. In others, expensive after-treatment or methods which impair the quality of the finished product must be resorted to if hydrogen sulfide is present in the charge. In all cases the corrosive effects of hydrogen sulfide on the process equipment are eliminated by its removal.

As new methods for converting the lighter components of refinery gases into marketable products are developed, removal of hydrogen sulfide will become increasingly necessary because hydrogen sulfide, due to its vapor pressure, tends to accumulate with these more volatile fractions. The Girbotol process† is an efficient method for removing hydrogen sulfide and other weak acidic gases from gas mixtures.

The Girbotol process originated with the discovery that acidic gases such as hydrogen sulfide and carbon dioxide react with certain amines to form compounds which may be broken down by heat. This reversible reaction may, in the case of hydrogen sulfide, be represented as follows:

$$RNH_2 + H_2S \rightleftarrows RNH_2HS$$

Where: R represents an organic residue.

The equilibrium proceeds to the right or left depending on the temperature, and on the partial pressure of hydrogen sulfide. In a Girbotol plant, hydrogen sulfide is washed from a gas mixture at one temperature at the beginning of the cycle and expelled from the amine solution at a higher temperature in a subsequent part of the cycle. Water solutions of the amines are usually employed. The cycle is continuous, and the hydrogen sulfide is recovered in concentrated form.

Fig. 1 shows a typical flow diagram of the process. Sour gas containing hydrogen sulfide flows into the base of the absorber, which is a bubble plate or packed tower. Lean amine solution enters the absorber near its top and flows in countercurrent relation to the rising gas, absorbing hydrogen sulfide in its downward passage. Gas free from hydrogen sulfide leaves from the top of the absorber.

Rich amine solution containing the removed hydrogen sulfide flows by absorber pressure, or is pumped, from the base of the absorber through the heat exchanger, and thence into the upper section of the reactivator. If the treating pressure is high, and if an extremely pure hydrogen sulfide is desired, a flash drum, operating at a lower pressure than the absorber, is placed between the absorber and the heat exchanger for releasing hydrocarbons dissolved in the solution due to the high treating pressure.

The reactivator is a bubble plate or packed tower. In or near its base there is the reboiler, which is an indirect heating element supplied with low-pressure steam or other suitable medium for boiling the amine solution and expelling the hydrogen sulfide. As the solution flows down through the reactivator, it is heated by ascending steam generated by the reboiler, and the hydrogen sulfide is expelled. In the reboiler the solution reaches its boiling point, slightly above the boiling point of water at the pressure of the reactivator.

Regenerated amine solution free from hydrogen sulfide is pumped from the base of the reactivator through the heat exchanger, then through the solution cooler, and back to the top of the absorber.

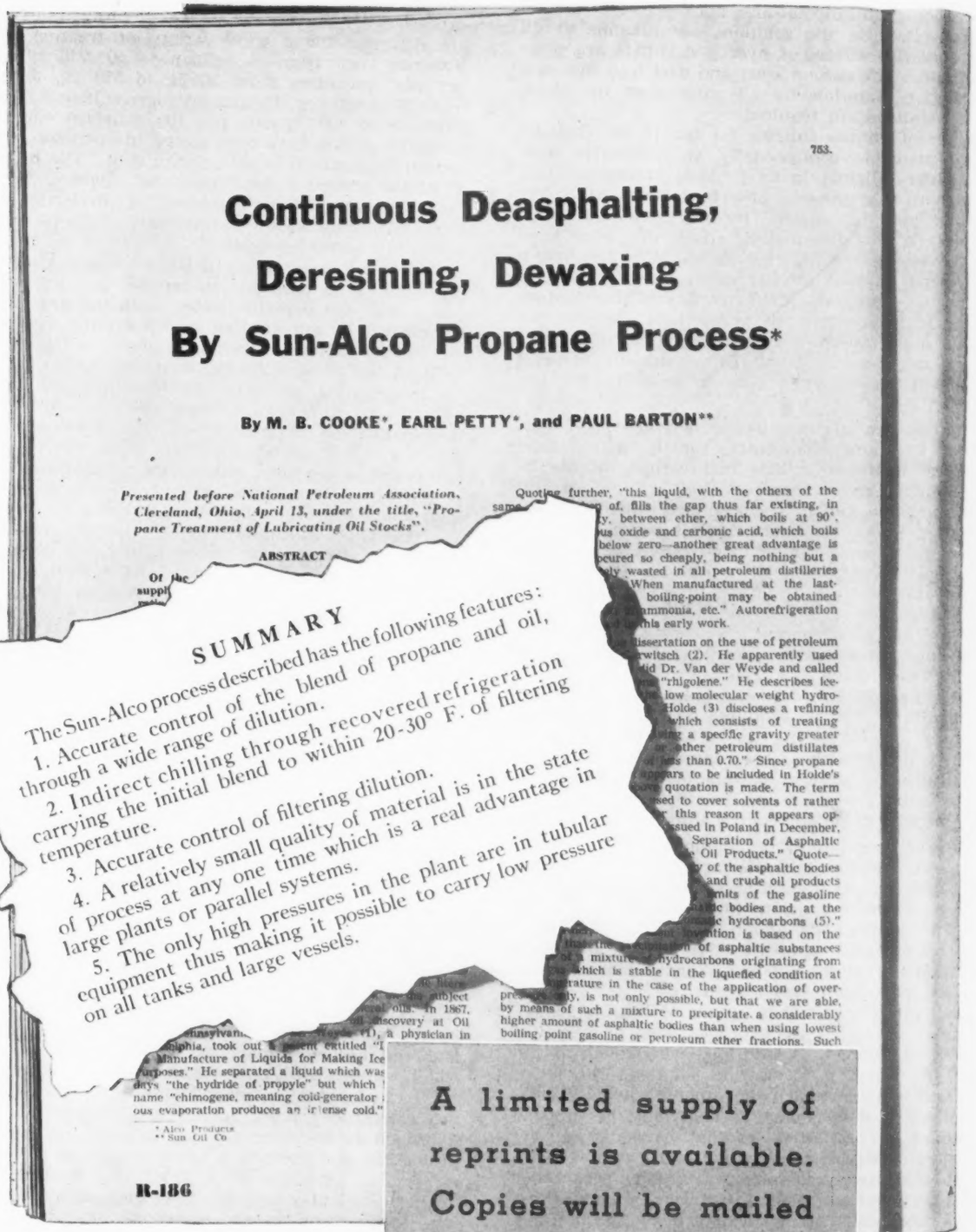
Hydrogen sulfide and steam flow together from the top of the reactivator to the hydrogen-sulfide cooler, where the temperature of the mixture is reduced to atmospheric and the steam condensed. The condensate returns to the top of the reactivator, and concentrated hydrogen sulfide flows from the cooler.

All of the equipment is standard, similar in design to a refinery absorption plant.

The plant is made fully automatic in operation by the use of suitable control equipment. No labor is required during routine operation except for control tests and for normal maintenance. The utilities needed for operation are exhaust steam, or its equivalent, for heating, water for cooling, and power for pumping the solution. Mechanical losses of amine solution are small, and the amine itself lasts indefinitely. Vaporization losses with monoethanolamine, a comparatively volatile amine, are

*The Girdler Corp., Louisville, Ky.

†Patents on the Girbotol process are owned by The Girdler Corp., Louisville, Ky.



753.

Continuous Deasphalting, Deresining, Dewaxing By Sun-Alco Propane Process*

By M. B. COOKE*, EARL PETTY*, and PAUL BARTON**

Presented before National Petroleum Association, Cleveland, Ohio, April 13, under the title, "Propane Treatment of Lubricating Oil Stocks".

ABSTRACT

SUMMARY

The Sun-Alco process described has the following features:
1. Accurate control of the blend of propane and oil, through a wide range of dilution.
2. Indirect chilling through recovered refrigeration carrying the initial blend to within 20-30° F. of filtering temperature.
3. Accurate control of filtering dilution.
4. A relatively small quality of material is in the state of process at any one time which is a real advantage in large plants or parallel systems.
5. The only high pressures in the plant are in tubular equipment thus making it possible to carry low pressure on all tanks and large vessels.

* Alco Products
** Sun Oil Co

R-186

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as low as one-tenth of a pound per million feet of gas treated.

The Girbotol absorbents are not corrosive toward steel or iron. Because the solutions are alkaline at all times, the corrosive effects of hydrogen sulfide are practically negligible. Low-carbon steel and cast iron are suitable construction materials for all portions of the plant, and no special alloys are required.

A number of amines suitable for use in the Girbotol process are available commercially at reasonable cost. Since each differs slightly in its physical properties from the others, there is a group of absorbents from which the proper amine may be selected for any particular purification plant. All of the amines which are used have the desirable characteristics of high capacity for hydrogen sulfide and carbon dioxide, rapid rate of reaction with the acidic gases, and low volatility. These amines are miscible with water in all proportions. Because the amines have high capacities for acidic gases, dilute water solutions may be circulated. This results in a small initial expenditure and low replacement costs for the reagent.

The amines are organic bases, derivatives of ammonia; and, like ammonia, react rapidly with acidic gases such as hydrogen sulfide and carbon dioxide to form hydrosulfides and carbonates. Until a high percentage of the available amine has been neutralized, the resulting solution has a negligible acid-gas vapor pressure. By carrying out the absorption in a countercurrent contactor, the acidic component of a gas stream may be stripped out completely.

The absorbent is a single component. There is no exact pH (Hydrogen-ion concentration) or acid-alkali balance to be maintained in the absorbing solution. This is important where there is a gradual accumulation of a fixed acid in the solution, as for example the accumulation of thiosulfuric acid in solutions scrubbing hydrogen sulfide from a gas containing traces of oxygen. The effectiveness of the available absorbent is not altered by partial neutralization of the solution or by variation in solution strength. There are no volatile components to pollute the purified gas. Plant-control tests are elementary.

When the temperature of the amine solution is raised, its capacity for acid gas falls off rapidly, and a solution containing acid gas may be completely regenerated by bringing it to its boiling point. Regeneration can be accomplished by boiling the amine solution in a simple evaporator or pot still. However, the use of a column for regeneration is more economical, inasmuch as it reduces the steam consumption materially.

The reactivator is primarily a unit of heat exchange. When a fixed gas such as hydrogen sulfide is driven from a water solution, it is saturated with steam at the temperature at which it leaves the solution. The lower this temperature, the smaller the amount of steam carried by the gas; and, inasmuch as heat must be supplied to the reboiler in proportion to that carried away by the steam, it is desirable to have the gas leaving the reactivator at a relatively low temperature. On the other hand, the top temperature of the tower cannot be too low, because heat must be supplied to bring the descending solution to its boiling point.

A simple calculation shows that for each treating condition there is an optimum feed-plate temperature to balance latent heat of effluent steam and sensible heat of amine solution. Because of the ease with which acidic gases are liberated from the amines due to the loose chemical bond, reactivators are designed and operated with the proper temperature gradient down the tower for minimum heat consumption. This design and operation result in a considerable saving in heat and in cooling water, inasmuch as a heat balance on the plant shows that the cooling-water requirement is directly proportional to the heat supplied to the reboiler.

Application of Process

At the time of writing there are four Girbotol plants completed or under construction for removing hydrogen sulfide from refinery gases, and seven plants for purifying natural gas. There are also five plants for scrubbing carbon dioxide from hydrogen produced by reacting hydrocarbon gas with steam. The hydrogen-sulfide plants are designed for a wide variety of treating conditions. Volumes vary from ½ million to 40 million cubic feet per day, pressures from 30 lb. to 550 lb., temperatures from 50 to 160 deg. F., and hydrogen-sulfide concentrations from 25 to 3000 grains per 100 standard cubic feet. In all plants which have been placed in operation, the hydrogen-sulfide removal is better than 99%. The high efficiency of the process is best illustrated, however, by the fact that the carbon-dioxide content of industrial hydrogen is reduced from 18-20% to practically zero in a single absorber of normal height.

In some cases, particularly in the treatment of natural gas, it is desirable to remove not only the hydrogen sulfide, but also the water from the gas. This is accomplished by substituting a dehydrating agent for water in the solution. Diethylene glycol is the agent being used at the present time.

Dehydration prevents the formation of hydrocarbon hydrates in transmission lines and the attendant reduction in line capacity. A number of dehydrating processes are in use. Diethylene glycol has great affinity for water, and is one of the most satisfactory hygroscopic agents employed. It is non-corrosive and practically non-volatile, and stable at reactivation temperatures.

The Girbotol amines are completely miscible with diethylene glycol, and a mixture of these compounds removes both hydrogen sulfide and water from a gas stream. The operating cycle is identical with the usual Girbotol cycle, except that the reactivator is operated as a fractionating column to remove water from the glycol. The presence of evolved hydrogen sulfide in the reactivator assists in drying the glycol, so that the combination plant reduces the dew point of the treated gas to a lower temperature than is reached by diethylene glycol alone.

By controlling the ratio of diethylene glycol and water in the absorbing solution, the moisture content of the treated gas may be adjusted to any desired point from complete saturation to practically zero.

The hydrogenation of oils consumes large volumes of relatively pure hydrogen. This gas is generally produced by reforming and converting hydrocarbon gases to a mixture of hydrogen and carbon dioxide (18-20%) by the action of steam in the presence of a suitable catalyst, and then removing the carbon dioxide. The process offers an economical means for reducing the carbon-dioxide content to practically zero in a cycle which is identical with the hydrogen-sulfide cycle. Separation with the amine solution is carried out at relatively low pressures, and the carbon dioxide is completely eliminated with small volumes of absorbing solution.

In hydrogenation plants where sulfur-free gas is not available, the process serves two purposes. It removes hydrogen sulfide from the hydrocarbon gas used for the production of hydrogen to prevent catalyst poisoning, and it removes carbon dioxide from the finished hydrogen. Such a plant may be built as a combination unit consisting of two absorbers and a common reactivator.

Within the scope of this paper it is impossible to describe all of the applications of the Girbotol process. Other uses, such as the recovery of carbon dioxide in dry-ice plants, the recovery of hydrogen sulfide, the purification of gas-engine fuel, and the production of inert atmospheres, have not been discussed. The process is a simple, unusually efficient process, applicable whenever it is desirable to remove or recover acid gases from gas mixtures. Its field of usefulness is being constantly expanded.

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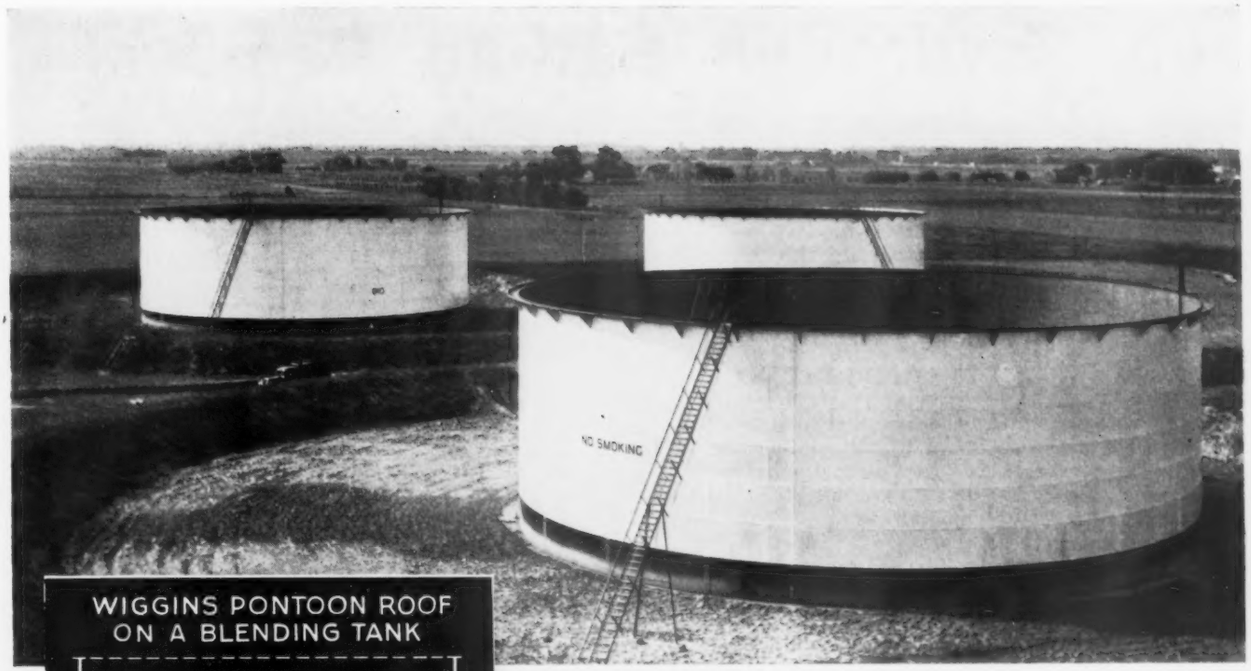
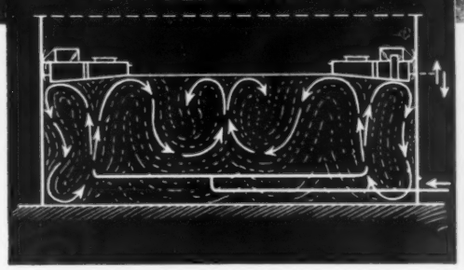
How to *Speed Up* Blending



WIGGINS PONTOON ROOF
ON A BLENDING TANK



LATEST reports on the blending of motor fuel in tanks equipped with Wiggins Pontoon Roofs continue to emphasize the reduction in time and consequent savings in pumping costs being secured in comparison with similar operations in ordinary tanks. Why this is possible can easily be understood by referring to the accompanying diagram showing the circulation set up by a blending spider in a tank with a Wiggins Pontoon Roof. Briefly, installations of this type offer the following advantages:

More positive circulation. Instead of merely rising to surface, jets of incoming liquid strike the underside of the floating roof and are deflected, causing circulation through entire tank.

Suitable for any size batch. Regardless of how full the tank may be, the Pontoon Roof always rides on the surface to promote better and faster circulation.

Reduces vaporization. Jets rising to top of a free liquid surface tend to cause bubbling. There is no vapor space under a Wiggins Pontoon Roof to permit this.

That such an improvement in operating efficiency is also accompanied by elimination of evaporation loss, reduction of fire hazard, and protection against deterioration of product quality makes the Wiggins Pontoon Roof an even more desirable feature for any tank in blending service. This is an improvement applicable to existing tanks as well as to new structures.

Good for Treating Tanks, too!

Processing tanks used in sweetening gasoline constitute one of the classes of service that bring into play the complete array of advantages offered by Wiggins Pontoon Roofs:

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3. More effective agitation possible.
4. Reduced evaporation losses.
5. Less fire hazard.

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WIGGINS BREATHER ROOFS

Tri-Potassium Phosphate Process For Hydrogen Sulfide Removal

By T. W. ROSEBAUGH*

(*Presented before the American Petroleum Inst., Wichita, Kans., May 23-25, 1938, under the title, "The Shell Phosphate Process for the Removal of Hydrogen Sulfide".*)

ABSTRACT

Solutions of 40% to 50% by weight of tri-potassium phosphate and sodium hydroxide are used to remove H_2S from petroleum gases, from which solution the sulfide may be recovered for any desired purpose. The process is simple and easy to control; the sulfide is absorbed at low temperatures, and driven off at higher temperatures.

A two-stream system may be used, employing a concentrated and a dilute solution, in many installations for more efficient operation. Liquids as well as gases may be treated in this process.

THE Shell phosphate process is a regenerative liquid-purification system for the removal and recovery of hydrogen sulfide from natural or refinery gases and liquid hydrocarbons. The flow diagrams illustrate the four principal types of installations.

Vapor-Phase Treating

The gas to be purified is scrubbed in a conventional bubble plate or packed absorber with an aqueous solution of tripotassium phosphate (K_3PO_4). Hydrogen sulfide is absorbed principally according to the reaction:

$$K_3PO_4 + H_2S = K_2HPO_4 + KHS$$

This reaction is reversed by boiling the solution. The vapor boiled off (hydrogen sulfide and steam) is condensed and cooled; the condensate is returned to the absorber, and the hydrogen sulfide is vented to suitable disposal; e. g., boiler fuel or to sulfuric-acid manufacture, sulfur recovery, process use, etc. The regeneration is usually accomplished in a standard reboiler heated with exhaust steam. In some cases a direct-fired regenerator may be used to advantage by employing a locomotive-type boiler for solution regeneration. High heat economy is realized through the use of exchangers on the solution to and from the regenerator. A final cooler lowers the temperature of the lean solution returned to the absorber.

The solution used runs from 40 to 50% by weight of tripotassium phosphate. This inexpensive solution is prepared at the plant with commercial grades of potassium hydroxide and phosphoric acid. The initial charge lasts indefinitely, as solution loss is confined to packing-gland leakage on pumps.

The equilibrium vapor pressure of hydrogen sulfide over tripotassium phosphate solution for a given hydrogen-sulfide saturation is greatly reduced upon diluting the solution with water. This reduction in vapor pressure with reduced tripotassium-phosphate concentration is peculiar to the phosphate process, and advantage is taken of this fact by using a system of split solution flow in the absorber. The bulk of the hydrogen sulfide is absorbed in the lower section of the absorber with a 40%

*Shell Development Co., San Francisco, Calif.

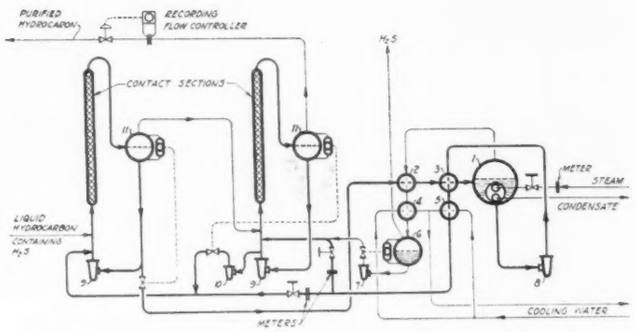

Fig. 2. Similar flow chart of the Shell process, for liquid treatment. 1. Reboiler-type regenerator. 2, 3. Exchangers. 4. Condenser. 5. Solution cooler. 6. Condensate accumulator. 7. Condensate pump. 8. Solution pump. 9. Circulating pumps. 10. Stage transfer pump. 11. Phase Separators

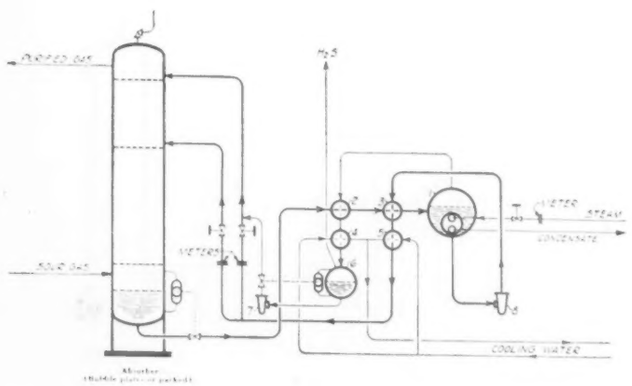

Fig. 1. Flow chart of the Shell Phosphate process for removing H_2S from Gases. 1. Reboiler-type regenerator. 2, 3. Exchangers. 4. Condenser. 5. Solution cooler. 6 Condensate accumulator. 7. Condensate pump. 8. Solution pump

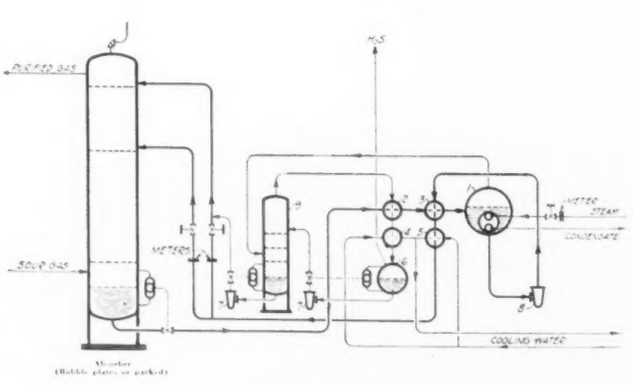

Fig. 3. A similar Shell process flow chart, for use where an extremely high degree of purification is necessary. 1. Reboiler-type regenerator. 2, 3. Exchangers. 4. Condenser. 5. Solution cooler. 6. Condensate accumulator. 7. Condensate pumps. 8. Solution pump. 9. Condensate stripper

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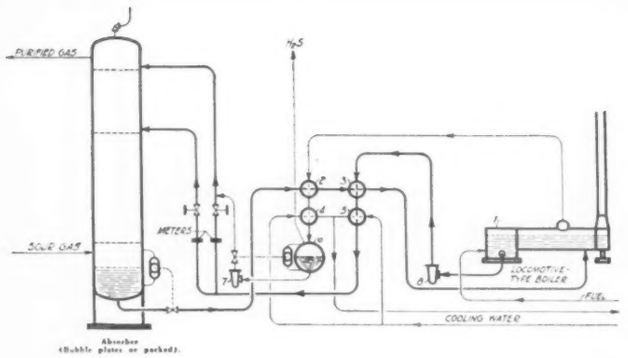

Fig. 4. The same Shell process in which a direct-fired regenerator is used; for either gases or liquids. 1. Direct-fired regenerator. 2. 3. Exchangers. 4. Condenser. 5. Solution cooler. 6. Condensate accumulator. 7. Condensate pump. 8. Solution pump

to 50% solution, while the more difficult absorption at lower hydrogen-sulfide concentration is accomplished in the upper section with a relatively dilute solution.

The system of absorbing hydrogen sulfide with solutions of different concentrations makes it unnecessary to regenerate all of the solution to the lower degree of hydrogen-sulfide saturation required for a low hydrogen-sulfide content in the treated gas. The dilute solution is obtained by returning the condensate from the regenerator accumulator to the top of the absorber along with a small amount of the regenerated solution. The greater portion of the regenerated solution is returned to the lower section of the absorber.

The effect of solution strength on the hydrogen-sulfide vapor pressure for 20% and 50% tripotassium-phosphate solutions for comparison is illustrated by the equilibrium vapor-pressure curves of hydrogen sulfide over these solutions for various degrees of solution saturation.

For many installations the phosphate process may be used economically for treating gases at temperatures up to 200° F. This is often an advantage in purifying the gases supplied to polymerization plants.

Liquid-Phase Treating

Liquid hydrocarbons may be treated for the removal of hydrogen sulfide. This is easily accomplished with the phosphate process, inasmuch as tripotassium-phosphate solutions are immiscible with hydrocarbons. Only one or two stages are necessary, depending upon the degree of purification required. The regeneration system is the same as that used for vapor-phase treating, and may be either the steam or direct-fired type. In liquid-phase as in vapor-phase treating, two-solution concentrations may be employed to advantage in a two-stage treatment.

Advantages of the Phosphate Process

1. The process is economical.

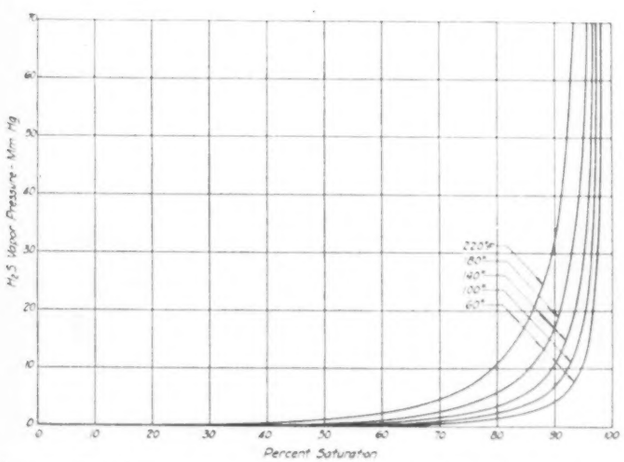

Fig. 5. Equilibrium pressure of hydrogen sulfide over 20% tripotassium phosphate solution

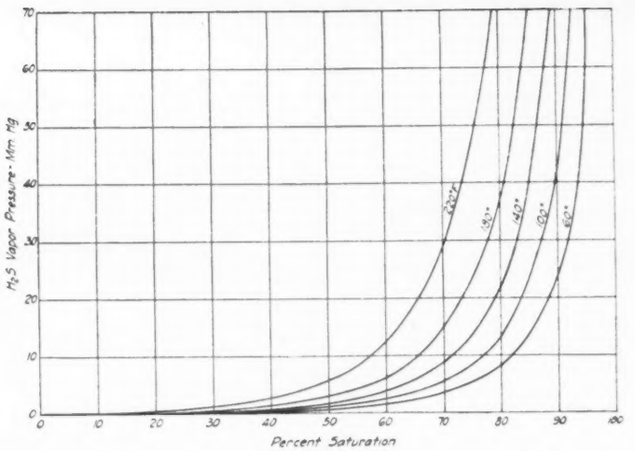

Fig. 6. Equilibrium pressure of hydrogen sulfide over 50% tripotassium phosphate solution

2. The process is practically non-corrosive to iron and steel equipment. (Copper or copper-bearing materials should not be used.)

3. Tripotassium phosphate is relatively inexpensive.

4. Loss of solution is confined to leakage, which may be controlled. There is no loss of treating agent to the gas or liquid being treated.

5. The process does not introduce catalyst poisons to the gas or liquid hydrocarbon treated for polymerization or other processing.

6. The process may be used economically for absorbing hydrogen sulfide at temperatures up to 200° F.

7. The process may be used for treating liquid hydrocarbons as well as gases, or a combination of treating steps using a common regenerating system may be employed.

8. Direct-fired regeneration may be used to advantage in many locations where steam is not available, or where an inexpensive fuel makes this type of regeneration more economical.

9. It is a self-operating process requiring a minimum of regulation and control tests.

10. Tripotassium phosphate is a very stable salt, and does not break down or decompose through complex side reactions in this service.

11. The plant is simple to construct, and requires a minimum amount of equipment — all of which is standard.

12. The maintenance cost is low.

Patents

The process is covered by U. S. Patents 1,945,163 and 2,110,403, assigned to the Shell Development Co. Other patents are pending.

Commercial Installations

At present (March 1938) installations are operating in the Martinez and Dominguez refineries of the Shell Oil Co., the East Chicago refinery of the Shell Petroleum Corp., and the Norwalk refinery of the Wilshire Oil Co. Another plant is under construction at the Watson refinery of the Richfield Oil Co.

New Gas Calorimeter

Revision of gas calorimeter tables in Circular C65, originally issued in 1917, makes it conveniently applicable to a wider range of compositions of gases and conditions of testing, according to E. R. Weaver, Bureau of Standards, who made the revision. The tables are used in connection with measurements of heating value.

The new Circular C417 contains a four-place table of correction factors for gas volumes for the temperature range 32° to 110° F. and the pressure range 24 to 31 inches. The Superintendent of Documents, Government Printing Office, Washington, will supply this circular at 10 cents each.

Air Filter for Gas Engine Winner In N.G.A. Kink Contest

TULSA, May 23.—Winner of the grand prize in the Operating Kink contest of the Natural Gasoline Assn. of America for 1938 was D. B. Young, Fittstown, Okla., superintendent for J. E. Crosbie, Inc. He called his "kink" an engine air filter and humidifier." Description and illustration of the device are given below.

The operating kinks session of the association's annual convention, at which the contesting kinks are displayed and described, was started two years ago as one feature of the general program. It has now grown in interest to such proportions that the board of directors is considering two changes for 1939. They are to double the prizes offered for the best kinks in each of the four classifications and to devote an entire day to the kinks session instead of a half day.

The number and the high type of kinks submitted for the 1938 convention session held in Tulsa May 13 have convinced the board that the entries have grown away from the elementary type submitted when the contest was first started. More time will be required, therefore, if each entry is given proper consideration.

Larger attendance of several companies' field men is another reason for devoting more time to the operating kinks session. Last year one company brought in as many field men as possible, entertained them at a "company" dinner, and had them attend the kinks session. This year four companies had company dinners and conferences with their field men. Success of these meetings has brought indications that other companies will adopt that policy next year.

The grand prize this year, shown in Fig. 1, was built as the result of increasing dust storms which made it necessary to filter air to gas engines. As the name indicates, it is a water filter. It is constructed of a metal box with two compartments, one the absorbing or filtering chamber and the other a scrubber or settling chamber. The former

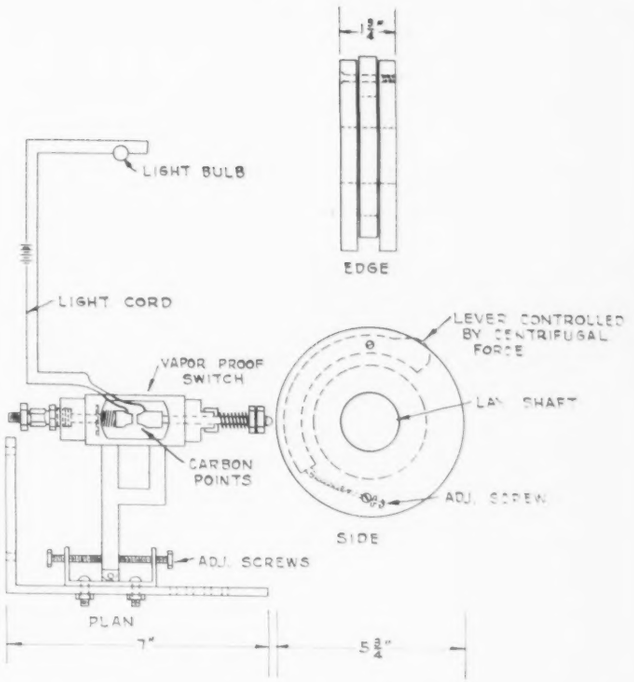

Fig. 2. First prize winner in Class A of the Operating Kinks Session was a gas engine speed indicator operated by centrifugal force on a lever rotated on the lay shaft of the engine

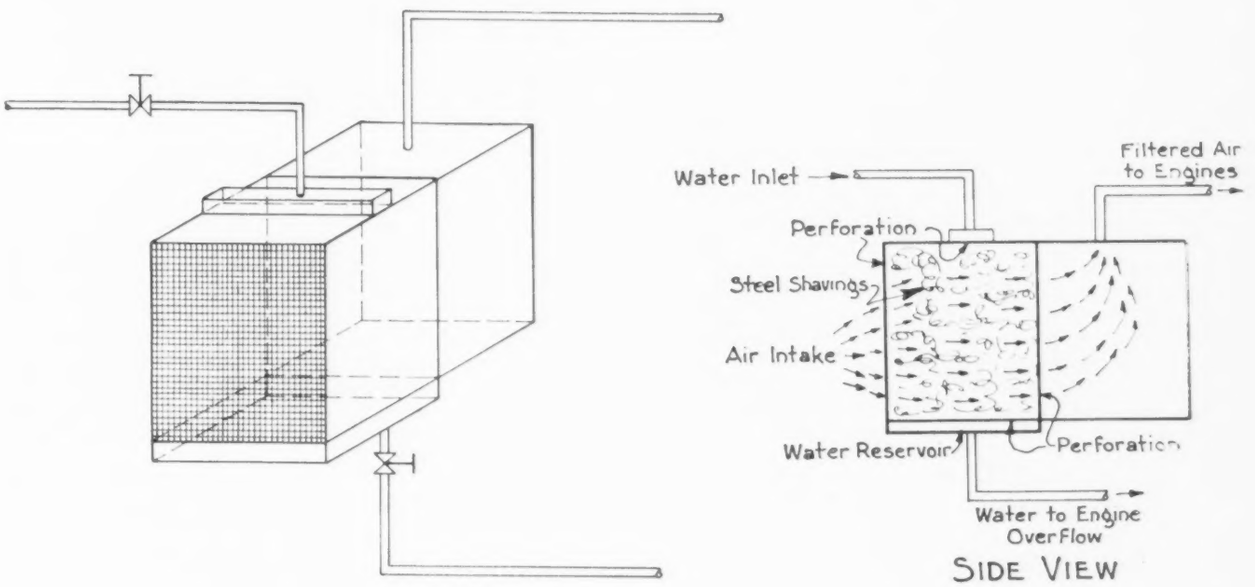

Fig. 1. An engine air filter and humidifier won the grand prize at the Operating Kinks Session, May 13, of the Natural Gasoline Assn. of America's convention in Tulsa

is packed loosely with shavings over which water pours steadily.

Although not as efficient as an oil filter it has the advantage, as a result of increasing the humidity of the air supply, of raising the horsepower of the engine. The results are said to be the same as derived from water injection but without the operating problems. It was stated at the kinks session that the engine could handle 15% more load. Construction of the filter is simple, as the drawing indicates.

Four prizes were awarded in each of three classes. First prize in Class A was awarded to C. F. Tubeville and Graydon Gower, Phillips Petroleum Co., Oklahoma City, for their low or underspeed indicator for gas engines. The advantage of the device, they stated, is its accurate and positive indication of allowable underspeed of gas engines driving gas compressors while maintaining rated horsepower and gas delivery of the unit, thus preventing waste.

The speed indicator's construction is shown in Fig. 2. The device utilizes centrifugal force to make electrical contacts with a vapor proof switch. This causes a light to flash if the engine speed falls below normal. A lever, fitted between two disks on the lay shaft, is thrown outward enough to prevent making the electrical contact when the engine speed is normal. At slower speed the short end of the lever emerges and contacts the point extension of the switch.

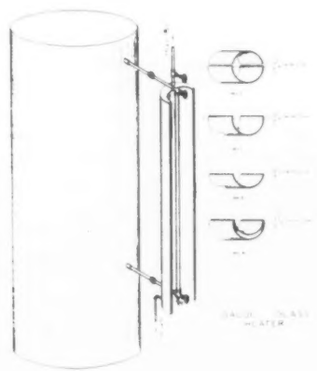

Fig. 3. A crescent shaped heating vessel for gauge glasses won first prize in Class B on the Operating Kinks Session. The method of construction is shown by diagrams 1 to 4

"The vapor proof switch", the makers explained, "is constructed from a sight feed lubricator part, has carbon points, and is very sensitive. The stand for the switch is so fabricated that the position of the switch can be varied by using set screws." The retaining tension on the operating lever can also be varied by an adjusting screw. The device was described as inexpensive to install, its use resulting in an increase in gas volume passed. The device can also be changed easily into a combination underspeed and overspeed indicator. It is only necessary to make a contact point on the opposite end of the wheel lever.

A gauge glass heater won first prize in Class B for F. Piland, Shell Petroleum Corp., Skellytown, Texas. In explaining the device, shown in Fig. 3, he said it can be constructed from pipe of suitable length and size to conform with any position or condition of gauge glass. The No. 1 drawing in the illustration indicates a piece of pipe cut open one inch above the center line. Parted, the pieces form two troughs, one being one inch deeper than the other, as indicated by the No. 2 and No. 3 drawings. Placing one within the other and then welding them leaves a space similar to a crescent, about one half inch wide at center.

Suitable connections welded in one side at bottom allow condensate to drain. Steam inlet connections are welded in top and bottom. Either exhaust or live steam can be used, but if live steam is used the outside should be insulated and steam trap installed on condensate line. When installed, Piland stated, the device affords a wind-break and heat for gauge glass and bottom cock, while still leaving the view of the glass unobstructed. It assures accurate level, prevents freezing of water or congealing of oil, and eliminates hazards created by steam hose or hot water, such as ice accumulating on ground.

A butane air conditioner made by G. D. Tidwell, Skelly Oil Co., Lyman, Okla., won first prize in Class D. The apparatus is made from a small heat exchanger and small motor-driven circulating pump placed outside the building, and a radiator and fan inside. An alcohol-water solution is circulated in a continuous cycle from the heat exchanger through the radiator and back again. Liquid butane from storage is expanded through the exchanger tubes to cool the alcohol-water solution. After the gas has passed over the tubes it is taken back into the plant intake lines, thus making operating cost negligible, it was said.

Tidwell stated that any type or size of discarded heat exchanger is suitable since there is no pressure to be held. He used an obsolete Buick water pump, a ¼ h.p. motor and an old style used radiator. A cabinet was installed in the office to house the radiator and fan. Louvres built into the cabinet permitted circulation. A ¼-inch oxygen needle valve set to attain the desired temperature controls the unit.

J. W. Cowles Wins N.G.A.A. Award

The winner of the Hanlon Award of the Natural Gasoline Assn. of America for 1938 is J. W. Cowles, Shell Petroleum Corp., Tulsa. The award includes an engraved watch and a bronze plaque on which the names of those receiving it are engraved. The plaque is displayed in the offices of the association. The winner is voted annually by the association for meritorious service to the natural gasoline industry.

The award was establishd last year and is donated by E. I. Hanlon, prominent natural gasoline manufacturer and chairman of the board of the National Bank of Tulsa. Presentation is made at the annual conventions of the association. First award was made to R. C. Alden, Phillips Petroleum Co.

Cowles has been recognized for years as an authority on casinghead gas contract forms. A graduate in law from the University of Nebraska, "Jim" Cowles opened an office at Holdenville, Oklahoma. Shortly afterward he entered the employ of the Department of the Interior. He joined the staff of the Oklahoma Petroleum Gasoline Co. in 1918 and was with Skelly Oil Co. from 1922 to 1926. He has been with the Shell organization since.

"State of the Art"

AS SEEN IN THE WORLD'S CURRENT TECHNICAL LITERATURE

By M. G. VAN VOORHIS
N. P. N. Staff Writer

Papers reviewed here were presented at the Mid-Year Meeting, American Petroleum Institute, May 23-25 at Wichita, Kansas

Tube-Stress Calculations Improved

Bailey's theory of creep stresses makes big improvement in calculating refinery tube strength. C. O. Rhys, Standard Oil Development Co.

Compatibility of R. W. Bailey's theory of creep stresses* with the general operating conditions of tubes in refinery equipment has been shown by a year's experience in applying the theory to computations of refinery tube stresses by Standard Oil Development Co. Variations in metal strength, creep rate and pressure stress through the tube wall, which are of great importance in the 900-1200° F. range, are included in the theory developed by Bailey but are not taken into account in the Lorenz-Lame theories which had been in use until a year ago.

Where there is a considerable range of ductility, as in most tube material, it is practically impossible for rupture to occur due to temperature stress. Why, in spite of this, furnace tubes cannot be designed on a basis of pressure stress only is explained by considering the effect of heat transfer on pressure-stress distribution and metal-strength variations through the tube wall. A numerical example shows that high-metal-temperature conditions govern tube design.

The form of equation most suitable for tube-stress calculations is:

$$\frac{\frac{2}{N'}}{K} = \frac{f'}{f' - \frac{P}{AN'}}$$

where

A = a constant depending on the material
f′ = working stress, determined by allowable creep rate and metal temperature
K = ratio $\frac{\text{outside diameter}}{\text{inside diameter}}$
N′ = a quantity found from the heat input
P = internal pressure

The factors most important to high-temperature metal subjected to heat input and internal pressure enter into the equation. As it is derived on a basis of creep and not elasticity, Young's modulus and Poisson's ratio are not included. This removes a source of error, as these quantities are difficult to determine for hot metal. The equation is of such a form that, for a known working stress, the tube proportions can be found directly without any cut-and-try methods.

* "The Utilization of Creep-Stress Data in Engineering Design," Proc. Inst. Mech. Eng. (London) Nov. 1935.

Simple Desalting Process Developed

Satisfactory desalting of crude is achieved with sodium carbonate solution and percolation through an excelsior column. W. P. Hawthorne and H. L. Bedell, Socony Vacuum Oil Co., Augusta, Kans.

Two satisfactory continuous methods for desalting crude petroleum have been developed in the laboratory. In the preferred method, with which 80% of the salt is removed, 3% of 0.3% sodium carbonate solution is emulsified with the oil, the mixture percolated through an excelsior column at 250° F. during 20 minutes, and settled at the same temperature for 50 minutes. The excelsior column was found to be more effective in resolving an emulsion than a corresponding mineral bed (14 to 20 mesh).

Comparison of laboratory data with plant results indicates that the success in laboratory experiments could be approximately duplicated on a commercial scale.

The other process involves repeated washing of oil through a sodium carbonate solution at 200° F. during 20 minutes and subsequent settling at this temperature. A continuous addition of less than 3% of 0.3% sodium carbonate solution is required.

Application of the most satisfactory laboratory treatment in the refinery involved the use of a 290-barrel container as a packed column and of a 350-barrel drum as a settler for each unit processing 10,000 barrels per day. Daily requirements for each unit were 13,000 gallons of water and 320 pounds of soda ash.

Simple settling of crude oil at normal or elevated temperatures did not remove salt unless an uneconomically long settling period is provided. Addition of sodium carbonate speeds up subsidence of emulsified particles and coalescence of separated drops more than addition of water alone. Agitation of boiling oil was found sufficient essentially to prevent settling.

If oil and a sodium carbonate solution are mixed by washing one liquid through the other, an efficient salt extraction can be obtained with very little emulsion formation. The effect is better if oil is washed through water than with the reverse operation. The separation of an emulsified water phase occurred more readily when this phase contained some extracted chlorides.

Experimental Desalting With Sodium Carbonate Solution

Added liquid	Sodium carbonate in Walnut River water (3 grams per liter)
Amount of added liquid, per cent by volume	3
Temperature at entrance to column, deg. F.	250
Temperature at entrance to settler, deg. F.	250
Temperature of settler, deg. F.	250
Time in excelsior bed, min.	20
Time in settler, min.	49
Pressure on system, lb. per sq. in., gage	81
Duration of experiment, hours	102 2/3
Volume of oil charged, liters	308

Chloride Removal:

	Average Values of Sodium-Chloride Concentration		
	Original Oil (Grains Per Gallon)	Treated Oil (Grains Per Gallon)	Removed (Per Cent)
1st 20 hours	9.6	1.5	84.3
2nd 20 hours	8.1	1.36	83.3
3rd 20 hours	7.34	1.17	84.2
4th 20 hours	8.42	1.62	80.8
5th 20 hours	9.72	1.84	81.0

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THE SCIENCE OF PETROLEUM

A Complete Encyclopedia of The World's Knowledge of Oil

SELDOM is it possible for a world industry to assemble, within the pages of a few volumes, all of the important facts of science, engineering and technology as written by the world's leading chemists and technologists. But this is what A. E. Dunstan, chief chemist of Anglo-Iranian Oil Co., has accomplished in his editorship of "The Science of Petroleum". Aiding Dunstan were three other prominent chemists and engineers, Prof. A. W. Nash, head of the department of oil engineering and refining, University of Birmingham, England; Dr. B. T. Brooks, one of the best known of America's chemical engineers and author of several technological works; Sir Henry Tizard, rector of the Imperial College of Science and Technology, London, and many other leading technologists.

This great encyclopedia is composed of 3200 pages covering 370 subjects. The first 833-page volume is devoted to geology and production engineering. Volumes 2 and 3 are devoted to properties of petroleum and its fractions. Volume 4 covers better utilization of products and the manufacture of products better suited to both new and old uses. The price of the four volumes complete is $85. Write to the book department

NATIONAL PETROLEUM NEWS

540 Penton Building Cleveland, Ohio

Average Water and Sediment:

	Original Oil (Per Cent)	Treated Oil (Per Cent)
1st 20 hours	0.26	0.30
2nd 20 hours	0.25	0.25
3rd 20 hours	0.24	0.11
4th 20 hours	0.27	0.27
5th 20 hours	0.31	0.35

Water Removal (Average Values):

	Water Added	Water Removed — Excelsior Column	Water Removed — Settler	Water Removed — Total	Percentage of Added Water Removed
	(Millimeters)				
1st 10 hours	900	490	25	515	57.3
2nd 10 hours	900	620	...	620	69.0
3rd 10 hours	900	503	110	613	68.2
4th 10 hours	900	237	354	591	65.8
5th 10 hours	900	136	442	578	64.3
6th 10 hours	900	92	501	593	66.0
7th 10 hours	900	68	507	575	64.0
8th 10 hours	900	55	533	588	65.5
9th 10 hours	900	60	573	633	70.5
10th 10 hours	900	57	590	647	72.0

The accompanying table shows the results of a long experiment which resulted in satisfactory salt removal and indicated successful continued operation. The high percentage removal of salt and the low water content of discharged oil proved satisfactory extraction and settling of water from the oil phase. The quantity of water removed was encouraging. While this amount did not equal the quantity charged, the percentage of charged water removed continued to increase as the experiment progressed, i. e., there was an accumulation of emulsion rich in water, but the rate of resolution of this emulsion approached the rate of formation.

* * *

Solvents Detect Cracked Tar

Cyclohexane and benzol distinguish composition differences between cracked and straight-run tars and asphalts quantitatively. A. H. Batchelder and H. B. Wellman, Standard Oil Co. of Cal.

A quantitative measure of the cracked-residuum content of fuels and asphalts may be derived from the per cent cyclohexane-insoluble less the per cent benzol-insoluble. The accompanying figure shows the results of attempts to classify asphaltic constituents in straight-run and cracked California residua on the basis of their content of asphaltenes.

Heptane alone is an effective asphaltene precipitant and cannot be used to differentiate between cracked and straight-run asphaltenes. Essential differences in the composition and behavior of cracked and straight-run tars and asphalts, however, have made advisable the development of a quantitative analytical procedure. A mixture of heptane containing 30% benzol is essentially equal to benzol with respect to the virgin residua; yet it precipitates some of the asphaltic constituents of cracked tars.

Even more favorable in this respect is cyclohexane. The right half of the accompanying figure shows negligible difference between cyclohexane- and benzol-insoluble contents of straight-run stocks. The per cent cyclohexane-insoluble less the benzol-insoluble can, therefore, be used as an index of the content of asphaltenes heavier than those found in straight-run residua. A slightly stronger solvent may be used to differentiate normal air-blown from cracked or straight-run stocks.

Additional evidence of formation of cyclohexane-insoluble asphaltenes was presented graphically as well as an illustration of relationships which may be used to determine the origin of asphaltic constituents of a blended tar or fuel. In those few instances where cracked tars are undesirable, as for instance in fuels which are to be severely cut back, a reasonable specification limit offers an effective safeguard, and avoids unnecessarily severe restrictions on gravity or sediment contents.

The conventional tests and inspections are unsatisfactory for quantitative work. Spot tests, which have been used to determine the presence of cracked residua in fuels and asphalts are necessarily qualitative, usually hypersensitive and frequently misleading because of the presence in some crudes of traces of asphaltenes insoluble in mineral spirits.

Better Tube Connections Needed

Machining oil-heating tube ends after upsetting inside and outside will be the next move to tighten tubes in connecting devices. Fred Key and W. H. Clendenin, Key Co.

One of the interesting developments made to meet the present-day operating conditions and requirements of a "tube-connecting device" or return bend fitting such as that used in cracking furnaces is that of upsetting the tube internally and externally and then machining to very close tolerances. This reduces the necessary amount of expansion 25%, especially in cases where heavy-wall tubing is used and leaves the full wall thickness of the tube in the expanded portion.

Every indication points towards increasing interest in this particular phase during the next few months. Today, due to the high pressures and temperatures, and the nature of the steel in the tubes to be expanded into the connecting devices, a point has been reached where it is questionable whether the tubes can be rolled satisfactorily to maintain tightness and still maintain a factor of safety.

In an experiment made on a piece of 5-inch outside diameter by ¾-inch wall tubing, a portion was cut out of the tube and the hardness measured at various points. While the tube originally had a Brinell hardness of 131 in the longitudinal cross-section, it was increased to as high as 163 in some points by the expanding operation. This increased the physical properties to some extent.

* * *

Corrosion Treated as Complex Problem

Corrosion prevention studies require methodical accounting for all inter-related factors. L. L. Davis, J. M. Jones, and C. A. Neilson, Continental Oil Co.

Uniform methods of studying and combating corrosion in the refinery have been productive for Continental Oil Co. Salt in crude oil continues to be one of the most serious problems of the oil refiner. However, the over-all system is so complex and factors are so inter-related that a discussion of any individual factor is of little value. Corrosion prevention studies necessitate the methodical and simultaneous study of all of these inter-related factors.

A typical distillation operation involving the relatively simple system of distillation of an acid-treated cracked distillate gives a general idea of the procedure. In this system sulfur dioxide is the only corrosive agent present and iron the only metal exposed. Rates of corrosion could be determined and iron loss was measured in pounds per hour for several rates of sulfur-dioxide evolution. Plots of these losses were made without corrosion preventatives and with two or three agents.

First attempt at chemical protection was the circulation of large volumes of caustic soda solution through the condenser system. Second attempt was gaseous ammonia injections to neutralize the sulfur dioxide but tests showed that twice the theoretical amount was required to reduce the iron loss by 95%. Final control of corrosion in this system was the equivalent to "removal of the source of corrosion before charging." This was accomplished by installing a Stratford continuous treating process.

Corrosion of crude distillation equipment usually occurs from the combined attack of hydrogen chloride and hydrogen sulfide. The prevention of this corrosion may be accomplished in a number of ways, such as by removal of salts from the crude before distillation, by neutralizing the hydrogen chloride after release by alkaline chemicals, by the use of special alloys in equipment fabrication, or by combinations of two or more of these methods.

While de-salting equipment and processes have been discussed extensively in the literature, the discussion of control of de-salting operations is more difficult to find. Control is usually quite critical. An exact balance of temperature, wash-water quantity, pressure, degree of emulsification and separation must be maintained at all times for uniform results. The usual procedure in controlling de-salting-plant operations is to determine the salt content of the crude oil before charging it to the process.

As a rule, the use of special alloys for corrosion prevention is limited to locations where the corrosion is so severe that the usual chemical protection fails. In determining the quantities of hydrogen chloride and hydrogen sulfide released, it was discovered that laboratory methods did not give the same release as the commercial equipment and corrections had to be made.

Ammonia has proved to be the most satisfactory neutralizing chemical for this type of corrosion and the trade literature amply covers the mechanics of its use. A wide difference of opinion exists, however, as to the correct amount of ammonia to use. This difference of opinion may arise through a lack of understanding of the relationships between pH and the quantity of corrosive chemicals present, and of the mechanics of ammonium-sulfide attack on brass.

Admiralty metal has been found to be relatively free from attack by large volumes of hydrogen sulfide, provided hydrogen chloride is absent or has been neutralized. If, however, sufficient ammonia is used to neutralize the hydrogen sulfide, the brass is rapidly attacked. Preliminary tests indicate that this probably is due to the fact that the ammonium sulfides dissolve or disintegrate the protective copper-sulfide film which is formed on the copper in the simple hydrogen-sulfide-copper system. This reaction is accelerated in the presence of free oxygen.

It is practical to show the relationship between pH and the amount of ammonia required to neutralize systems of hydrogen chloride and hydrogen sulfide. It is concluded that, in a system composed of appreciable hydrogen chloride but only a trace of hydrogen sulfide, ammonia may be used to reach a pH of 8 to 8.5 with very little surplus ammonia used over that required to neutralize the hydrogen chloride. With this pH of 8 to 8.5 in an iron-copper-alloy distillation system, there would probably be little or no attack on copper alloys, and the iron would be fully protected.

With higher concentration of hydrogen sulfide it was

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found that even at 5.6 pH, more ammonia was required than the hydrogen-chloride equivalent. With higher pH values the ammonia requirement increases rapidly until at a pH of 8.5 practically twice as much ammonia has been used as was required for the hydrogen-chloride neutralization. This large excess of ammonia in the form of the acid sulfide would cause rapid attack on the copper alloys. Under this condition the most logical thing to do is to change to an all-iron system to permit the use of an excess of ammonia.

* * *

Oil-Storage Vessel Developments

Storage tanks and vapor saving devices meeting the trend toward higher vapor pressures. D. E. Larson, Chicago Bridge and Iron Co.

The numerous methods employed to reduce losses from volatile liquids include elimination of air circulation in the vapor space, reduction of temperature variation, elimination of vapor space, the use of variable vapor space and storage under pressure. Well-known applications of these methods are the use of gas-tight fixed roofs with conservation vents, reflecting paints, water-top roofs, water-spray systems, insulated roofs, sunshades, breather roofs, lifter roofs, water-displacement systems, floating roofs, and pressure vessels.

More recent developments include the use of improved floating roofs for working tanks, balloon systems for existing storage tanks, balloon roofs for marketing tanks, and Hortonspheroids for a wide range of volatile products. No really outstanding developments have been made in floating roofs since the Wiggins pontoon roof was introduced about eight years ago. Recent work directed toward increasing floating-roof efficiency has centered around improvements in the design of the seal which closes the space between the rim of the roof and the tank shell.

Improved materials, now available, have made this possible. A secondary seal is provided which consists of a closed loop of a tough and resilient material mounted on an extension plate at the top of the shoe. This loop makes adjustable contact with the tank shell and seals the space between it and the shoe. Welded tanks have increased the efficiency of the seal also since the shoe and seal does not have to slide over rivet heads.

Data gained from actual failure tests on a 100,000-barrel spheroid tank designed for a working pressure of 2½ pounds per square inch pressure have shown how it would fail as a result of excessive gas pressure caused either by an explosion or by the failure of the relief vents to function. It was first filled with water to the top capacity line. Failure occurred at six pounds by tearing the single lap-welded seams in the roof.

When the water level was reduced from 40 feet to 32.8 feet and the test repeated after the roof was repaired, the second failure occurred with greater violence and greater damage to the tank but was still confined to the roof seams showing that the roof provides a so-called weak section for relief of excessive pressure. The conditions to be dealt with in a spheroid tank fire following an explosion would be similar to those encountered with cylindrical tanks. The rich vapor mixture normally present in a pressure vessel, however, is excellent insurance against the occurrence of such an explosion.

Activities OF EQUIPMENT MANUFACTURERS

SOUND WAVES DISRUPT SOLIDS—Use of ultrasonic waves in preparing colloidal solutions of solid substances in liquids is the subject of a current patent application filed by Dr. Karl Sollner, Cornell University, and assigned to the Acheson Colloids Corp., Port Huron, Mich. The invention is based upon the observation that solid particles of a certain form or structure are disrupted by sonic and ultrasonic waves.

The ultrasonic waves have a vibration frequency producing sound waves beyond the range of audibility of the human ear. These sounds are produced by a high frequency current generator and a piezo-electric crystal of quartz which has a natural frequency between 160,000 and 250,000 cycles per second.

The new technique is particularly adaptable for preparation of colloidal dispersions of substances of small cohesion and high cleavage, particularly substances of laminar structure, in a liquid in which the material is insoluble.

With completion of production changes Acheson Colloids Corp. will be able to manufacture colloidal graphite of a much finer particle size and longer suspension than has been available heretofore, the company states.

* * *

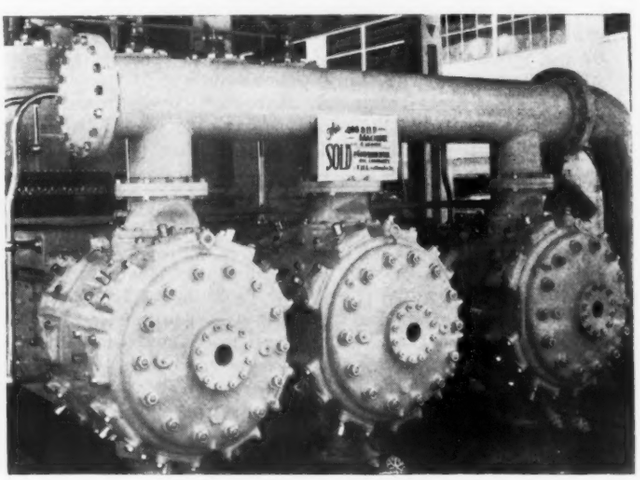
CREEP TESTS—Study of the "creep" of steel and metal alloys will be conducted in a battery of unique electric furnaces being built by Westinghouse. Three new testing machines just completed comprise the most elaborate creep testing apparatus in the world, it is said. With all three in operation it will be possible to conduct 180 simultaneous tests.

Each machine is a heavy alloy steel block housed in a three-walled cylinder taller than a man and supported on a sand foundation to minimize the effects of vibration. Temperatures up to 1000° F. are maintained within 10 degrees or less by automatically operating a resistance which controls the electric current. The cylinder revolves once an hour to assure equal heat distribution.

* * *

AN UNUSUAL RECORD of actual sales of equipment at the International Petroleum Exposition was reported by Clark Brothers Co., Olean, N. Y. These sales amounted to approximately $110,000. The 400 hp. "Super-2-Angle" compressor which was the main feature of the exhibit was sold, along with four additional identical units to Continental Oil Co. to constitute the compressor installation at its new gasoline plant in the K.M.A. field near Wichita Falls.

The water-flooding unit on display was sold to Alluwe Oil Corp. for service in Rogers county, Oklahoma. This consisted of a "Bobcat" vertical engine and a triplex pump.



Clark Bros. Compressor displayed at the International Exposition

ternational Petroleum Exposition.

* * *

VALVES—"The Inside Story of Crane Plug Disc Globe and Angle Valves" is the title of a new, 8-page, two-color booklet just released by Crane Co., 836 S. Michigan Ave., Chicago. This line of valves is recommended for throttling, soot blower, blowoff, boiler feed, drip and drain lines or for any other severe service where valves are operated in any but a full open or closed position, the booklet states. A list of essential characteristics of each member of the plug disc family is given.

SCORE YOUR STATIONS For Efficiency Through An "N.P.N." Inspection

A PRACTICAL means for checking the operating efficiency of service stations is offered oil companies and individual station owners and operators through the NPN Service Station Inspection Forms published on following pages of this issue of NATIONAL PETROLEUM NEWS.

The scoring of a station property on the basis of its operating efficiency, together with a study of its operating costs, as compared with the profit yardstick offered by the Minimum Profit Standards for service stations developed earlier by NATIONAL PETROLEUM NEWS and republished in this issue, provides a method for the owner, or operator, to rate his station on the basis of its ability to profitably meet today's competition.

These inspection forms and the Minimum Profits Standards were especially developed by the editorial department of NATIONAL PETROLEUM NEWS as a part of its spring rehabilitation campaign covering marketing operations of oil companies generally, to tell oil companies what costs they must meet in marketing and to suggest means by which their present facilities could be improved in efficiency to allow the companies to meet these costs.

The inspection forms for service stations are simple, non-technical and exceedingly practical in nature. The questions can be answered by anyone who will take the time to inspect carefully the station building, the equipment, the yard and driveway.

The method of scoring by which the station can be rated for its operating efficiency is equally simple. The total number of questions asked is shown for each of the various sections of the inspection form. Each question is asked in such a manner that the checking of the "Yes" square following the question indicates the person making the inspection is satisfied with the efficiency status of the equipment or property which is the point of that particular question.

The complete service station score or rating is obtained by taking the grand total of "Yes" answers, multiplying it by 100 and dividing it by the grand total of questions asked, which gives a percentage figure. The total questions asked are shown at the bottom of each section of the inspection form.

In addition to a rating for the entire station, separate ratings can be secured in the same manner for the various divisions of the inspection report, as gasoline pumps, underground tanks, driveways, building exterior, building interior, rest rooms, lubritorium, lifts, lighting, fire extinguishers, air compressors, air service outlets and heating systems.

Study of a few of the questions will show the practical nature of the questions in the inspection form and how easily a condition can be remedied. Any one condition may not affect the operating efficiency of the station, or its appearance, but the cumulative effect of such conditions may be causing a high operating cost and may be affecting the appearance of the station property to the point it is losing trade.

The Minimum Profits Standards for service stations which are republished in this issue, together with much valuable additional editorial material on station design, operations and other topics, are the result of a study of service station investment and operating costs, as taken from the records and books of many companies large and small. There is also shown the cost per gallon of varying monthly gallonages put through a station based on these average investments and operating costs.

Further studies by NATIONAL PETROLEUM NEWS along this line showed that the gross income from all sales at smaller stations of the neighborhood type was about 4.75 cents a gallon and for a large station 6 cents a gallon. Using the Minimum Profits Standard form as published in this issue and determining the actual operating costs of his own stations, the station owner for any given property can determine if the business he is now getting at a station will allow him to operate at a profitable basis in today's competition.

If that station owner, or operator, is not satisfied with the performance of the property today, the NPN Service Station inspection form may help him find where operating costs can be reduced through making sure that his present equipment is in an efficient condition.

Also, the Standards for Service Station Cleanliness and Appearance which are a part of the NPN Minimum Profit Standards for stations, will help him bring the individual station to a point in its appearance and sanitation where it will get the gasoline, and other business, of a fast growing portion of the public which today is avoiding stations whose appearance indicates they may have an unsanitary rest room.

NATIONAL PETROLEUM NEWS offers in the following pages its Service Station Inspection Form and its Minimum Profit Standards for stations as an aid for lower costs and greater profits in this branch of oil marketing.

The Modern Service Station

This station is faced with Carrara glass, with horizontal metal bands of stainless steel and lettering of solid metal. In the tower, glass blocks are used with an orange and blue glass background so that colored light effects are possible through them at night. One of the features of this station is the unobstructed display window, made possible with bent plate glass

Simplified Construction Efficient Equipment Clean Housekeeping

By John W. Thompson

N. P. N. Staff Writer

YOUR CUSTOMERS won't wait. They're in a hurry. So make way for them.

Be sure the curb cuts and drives are wide enough for them to enter the station with safety, even though they are driving faster than they should.

Locate the pump island so a minimum amount of turning is necessary to approach it. Have enough pumps to promptly serve these in-a-hurry customers.

Have the lubritorium located so that the pump island customers can drive directly into it, with a minimum of turning.

Be sure the air towers are located off the main drive to avoid blockading the entrances and exits.

Have your equipment up-to-date and in good working order so your customers won't have to wait while you clean out a clogged grease gun or a frozen hi-boy pump.

Work fast and talk to the point; for, regardless of whether or not your customer is going someplace, the fact that he's in his car has put the suggestion of haste in his mind.

The conditions outlined above determine the specifications for the modern service station. It now appears quite definite that the era of the massive and luxurious service station "palace" has gone, and in its place is appearing the service station of simple and practical rectangular design, built for utility and pleasing impression. Even motorists are remarking about how much like a service station the modern station looks.

The modern station, because of its simplicity of design, is clean and unassuming. Building materials are being selected which not only have a neat appearance but which do not necessitate a high maintenance expense.

During the past 15 years, service station architects and designers in many cases threw caution and education to the winds and developed stations that should have found their way into the souvenir guide book on "Things To See While In Our City."

But more recently, signs of restraint and practicability have crept into service station plans. An intelligent use of the great variety of building materials has resulted in neat and trim stations being erected entirely in harmony with the surrounding neighborhood, and

Service Station Inspection And Efficiency Rating Forms

GASOLINE PUMPS

	Yes	No
Are pumps freshly painted and clean?	☐	☐
Does brand name appear on pumps and is it easy to read?	☐	☐
Is pump globe clean and lamp bulb working?	☐	☐
Is hose nozzle tight, with no leaks?	☐	☐
Are hose connections and couplings tight?	☐	☐
Is visigauge clear of dirt and coloring matter?	☐	☐
Is meter shaft stuffing box well packed and is packing nut tight?	☐	☐
Has motor been lubricated in the last six months?	☐	☐
Is strainer clean and checked every month?	☐	☐
Is packing nut gland tightened down?	☐	☐
Is tank cleaned each spring and fall to prevent water getting into pump meter?	☐	☐
Is pump by-pass valve clean and operating freely?	☐	☐
Is dial face clean and readable?	☐	☐
Are electrical connections tight and wires fully enclosed in conduit?	☐	☐
Is pump securely fastened to base?	☐	☐
Does meter register correct measure? (Test with a test bucket)	☐	☐
Do motor brushes make good contact and are they free from wear?	☐	☐
Is pump belt tension properly adjusted?	☐	☐
Is hose free from cracks or wear?	☐	☐
Are contacts of light and motor switches clean and do they operate properly?	☐	☐

NOTES .....

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Your Gasoline Pump Score

Total questions asked 20

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{20} = \ldots\ldots\ \%$$

UNDERGROUND TANKS

	Yes	No
Has water been removed from tanks? (Test for water with water test paper or by air test method)	☐	☐
Are all fill openings and vents of tanks located outside station?	☐	☐
Are all fill caps properly designated by color?	☐	☐
Are fill caps, fill cap locks, and vent caps free from cracks or broken sections?	☐	☐
Are vent caps equipped with screens, and are screens clean?	☐	☐
Do foot valves and angle check valves hold properly? (In the morning, if first few test buckets withdrawn are not correct, the valves are probably not functioning properly)	☐	☐
Are vent lines open?	☐	☐
Are tanks located off the drive, so they will not be subjected to continual vibrations from driveway traffic?	☐	☐
Do all vents extend to the eaves of station building, or discharge at a safe distance?	☐	☐

NOTES .....

.....

.....

Your Underground Tank Score

Total questions asked 9

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{9} = \ldots\ldots\ \%$$

DRIVEWAYS

	Yes	No
Is the driveway free from signs, tools, litter, rubbish, and other obstructions?	☐	☐
Are curb cuts wide to permit easy entrance and exit?	☐	☐
If drive is cinder or gravel, is it raked smooth?	☐	☐
If drive is concrete, is it hosed every day?	☐	☐
If drive is concrete, is it free from cracks or breaks?	☐	☐
Are drive approaches clean and curbing whitewashed?	☐	☐
Is pump island curbing whitewashed?	☐	☐
Are drives and pump island clear of oil and grease which might cause a customer or attendant to slip?	☐	☐
Is pump island free from cracks and broken sections?	☐	☐
Is shrubbery properly cared for and neat in appearance?	☐	☐
Is lawn cut regularly and kept in good condition?	☐	☐
If station property has a fence or border wall, is it free from cracks, breaks, and is it freshly painted?	☐	☐
Is driveway level at the pump island?	☐	☐

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what's more important, in harmony with the job they are designed to do.

Today we have station buildings constructed of concrete products, porcelain enamel, glass, pressed wood, and various combinations of these, as well as numerous other building materials.

To mention a few building materials more commonly used in service station construction, we list the following, beginning with the least costly:

(1) Wood frame with metal lath and stucco.
(2) Wood frame with plywood.
(3) Concrete block with cement wash.
(4) Masonry (block or brick) with stucco.
(5) Precast concrete slabs.
(6) Reinforced concrete.
(7) Precast concrete slabs with porcelain veneer.
(8) Masonry (block or brick with porcelain veneer.
(9) Insulated steel with porcelain veneer.
(10) Steel frame with porcelain facing.

There are other materials equally popular, such as terra cotta, plate glass, and structural glass. Gaining ground over the past year as a means of modernizing station fronts, structural glass lays claim to a number of advantages, including resistance to warping and swelling, the fact that commonly used liquids will not penetrate it and that it does not absorb liquids and gases and that it is easily cleaned by wiping with a damp cloth.

Advertisement

Every

Oil Man

Can Have

Twins

See Pages 52-53

Easy approach and exit, both at the pump island and the lubritorium, is an important factor in modern station design. An excellent example is shown here in this station at Santa Rosa, Cal.

Plate glass has proven a helpful factor in making the station a service showcase. The Standard Oil Co. of Ohio has recently constructed some highly impressive stations, using plate glass walls all around and from roof to floor, except for metal panel strips.

A new concrete application, known as vacuum concrete, has come to the attention of builders during the past year. It is a concrete made in the ordinary manner, but treated by a vacuum compression process, which extracts a large amount of the mixing water. This action compresses the concrete and compacts the mass, with a claimed result of a 30 to 80 per cent increase in compressive strength over untreated concrete of identical mix.

How are responsibilities divided in the construction of a service station? Here is the way one major oil company sets up its general specifications on service station buildings.

Drawings and Specifications—by the oil company.

Supervision—to be supervised by contractor and inspected by the oil company.

Ordinances, Fees, Permits, etc.—contractor assumes responsibility in arranging for these, and is held responsible.

Installation of Equipment—governed by the standard practice of the oil company.

Excavation—by the contractor.

Concrete Work—floors to be of concrete 4 inches thick. Concrete drives to be 5 inches thick with wire mesh reinforcing.

Masonry—contractor to furnish and lay all masonry.

Structural Steel—in accordance with the code of standard practice of the American Institute of Steel Construction.

Carpentry—contractor to furnish and erect all framing, rough and finished hardware, etc.

Lathing—all metal lath shall be approved expanded metal lath.

Plastering and Stucco—three coats of standard plaster applied on metal lath in interior; exterior three coats of cement stucco.

Roofing and Flashing—composition

This Elk Refining Co. station, at Charleston, W. Va., is of a type designed to meet the demand for streamlined appearance and low maintenance. It is of insulated steel construction, with porcelain enamel exterior, and can be erected at an above ground cost of approximately $4000. This cost does not include such items as wiring, plumbing, and heating. The steel walls are filled with 3 inches of insulation material which is claimed to have an equivalent value to more than 16 inches of brick

KNOW YOUR STATION THROUGH AN NPN INSPECTION

	Yes	No
Are all signs new or freshly painted?	☐	☐
Are overhanging sign standards plumb?	☐	☐

NOTES .....

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Your Driveway Score

Total questions asked 15

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{15} = \text{.....} \%$$

BUILDING EXTERIOR

	Yes	No
Has exterior been painted or cleaned within the past year?	☐	☐
Are windows clean?	☐	☐
Have all unnecessary signs and advertisements been removed?	☐	☐
Are price signs neat and easy to read?	☐	☐
Are rest room signs easily seen from cars at the pump island?	☐	☐
Are roof and flashing in good condition, with no signs of rotting or loosening?	☐	☐
Are gutters and downspouts water-tight, and are hangers tight?	☐	☐
Do window sash open easily?	☐	☐
Is glass in windows and doors uncracked and unbroken?	☐	☐
If overhead doors are used, do they open and close easily?	☐	☐
If station has a canopy, are molding strips, ceiling and roof in good condition?	☐	☐
Are electric wires well insulated at point where they enter building?	☐	☐
Are insulator brackets solid?	☐	☐
Are wall surfaces of building in good condition, not chipped, cracked, or broken?	☐	☐
Have empty cans, barrels, boxes, and rubbish been removed from around building?	☐	☐
Is water hydrant free from leaks?	☐	☐

NOTES .....

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Your Building Exterior Score

Total questions asked 16

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{16} = \text{.....} \%$$

BUILDING INTERIOR (General)

	Yes	No
Have walls, woodwork, floors and ceiling been painted within the last year?	☐	☐
Are walls, woodwork, ceiling and floors free from dust, grease, soot and cobwebs?	☐	☐
Is plaster on walls and ceiling free from cracks or broken sections?	☐	☐
If floors are of concrete, are they free from cracks, settling, or crumbling?	☐	☐
If floors are of wood, are they in good condition, with no sign of rotting or wearing thin in spots?	☐	☐
Is accessory display neat and attractive?	☐	☐
Are there sufficient shelves for storing the accessory stock?	☐	☐
Are window displays clean, neat and attractive, and do they feature the most readily saleable and seasonal items?	☐	☐
Have all signs, posters, charts, pictures and notices which are unnecessary to station operation and which detract from the station's appearance, been removed from walls and bulletin boards?	☐	☐
Can attendant see approaching cars from inside station?	☐	☐
Are electrical switches enclosed in a cabinet?	☐	☐
Are contacts of circuit switches clean?	☐	☐
Are proper fuse sizes used? (Consult local power company)	☐	☐
Is there a place for brooms, overalls, tools and other incidentals when not in use?	☐	☐
Are cans with covers provided for rubbish?	☐	☐
Is office desk kept clean and neat appearing? (No milk bottles, lunches, or unsightly rubbish on the desk)	☐	☐
Are light globes, reflectors and fixtures clean?	☐	☐
Are light bulbs in good condition?	☐	☐

NOTES .....

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Your Building Interior Score

Total questions asked 18

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{18} = \text{.....} \%$$

REST ROOMS

	Yes	No
Does each rest room contain, besides the toilet, a mirror, wash bowl, soap, soap container, toilet tissue, clean towels, and a waste basket?	☐	☐
Are rest room windows clean?	☐	☐
Are the walls, woodwork, floor and ceiling clean and neatly painted?	☐	☐
Is the light switch readily accessible?	☐	☐
Are the toilet bowls and wash bowls clean?	☐	☐
Do the toilets work?	☐	☐
Are the toilet seats kept freshly painted and clean?	☐	☐
Are hooks provided on backs of doors?	☐	☐
Are inside locks provided for doors, to insure privacy?	☐	☐
Is porcelain in toilet and wash bowl free from cracks?	☐	☐
Is wash bowl drain clean and open?	☐	☐
Is stopper provided for wash bowl?	☐	☐
Are fittings of toilet flush tank free from corrosion?	☐	☐
Is rubber flush valve ball in toilet in good condition, not rotted or broken?	☐	☐
Are rest rooms kept clear of any stored articles or equipment?	☐	☐

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The modern service station, clean-cut and well groomed, fits well into this wooded setting at Brookline, Mass. Wide entrances and roomy drives are contributing factors to this station's success

roofing shall be equal to 10-year guaranteed roof .

Doors and Windows—of wood.

Painting—done under supervision of oil company, with the oil company's approved materials.

Electrical Work—contractor to furnish labor and materials to install in accordance with the oil company's specifications.

Plumbing—contractor to furnish and install pipe, fittings, fixtures, and equipment, as shown on oil company's drawings, and as required to make a complete service station piping system for sanitary drainage, water, air, and gasoline service.

Heating—contractor to furnish and install complete heating system as required by oil company's drawings and specifications.

For driveways, concrete in general has been found the best material and is recommended in most cases. Another popular type of surfacing consists of stone impregnated with a hot-poured asphalt, or with a cold or emulsified asphalt.

Crushed stone or chat is probably the most economical from the standpoint of first cost, but some companies believe that over a period of time it is more costly than the other two types mentioned above, due to the necessity of continual grading and filling in low spots.

One oil company recommends, when using a concrete drive, a thickness of at least 5 inches and a 1:2:4 mix, that is, one part cement, two parts sand, and four parts of rock or gravel. It further recommends that the slab be reinforced with reinforcing wires and with not less than ⅜-inch rods where slabs are over underground tanks. These rods should be run in both directions and extend from the edge of the tank hole at least 24 inches into the adjoining slab. Also, it is recommended that expansion joints be provided to allow for contraction and expansion of concrete with changes of weather.

Inasmuch as the gasoline pumps are the most frequented of all the station's services, it is only natural that the location of the pumps and pump islands should be the hub of the layout. Modern service station design, which, after all, is only applied common sense, dictates that the pump island shall parallel traffic, so as to permit the motorist to drive up to the pump with a minimum of effort or inconvenience.

One large oil company reports that a careful study is essential to determine that flexibility of operations and full utilization of equipment will be attained in laying out the pump islands. This company believes the twin island (containing two pumps) is probably the most adaptable to the modern station property layout.

The servicing of cars on both sides of the island produces an efficient layout and care must be exercised to provide a double traffic lane on each side of the islands. This eliminates the objectionable yard traffic congestion frequently caused with a single lane layout.

Dressing the station interior up to look like a store with the stock on open shelves, breaks down sales resistance. This station is located in Westchester County, N. Y.

ONE oil company points out that the triple island, one containing three pumps, offers several undesirable operating conditions. It is pointed out that the introduction of a third grade competitive gasoline has made it necessary to provide additional pumping equipment, but that the problem can usually be solved by a studied arrangement of equipment on twin islands instead of on a triple island. A survey of the average amount of sales of the three grades will probably indicate that it is not economical to install equipment for dispensing all three grades from each island, and this company states that it will be generally found that the regular grade represents a high percentage of the sales, and the other two grades a smaller percentage.

Under such conditions it would appear advantageous to distribute the equipment in proportion to the sales of each product.

This same oil company continues by stating that the distance between the end pumps on a triple island is less than the length of a car, which allows only one car to be serviced on each side. This condition prevents the possible 100 per cent utilization of equipment in simultaneous filling oper-

The gumbug patrol

Did you ever see a bluecoat patrolling the park at night with a flashlight?

You can't see the Chemical Cop on gum patrol in your gasoline—he doesn't need a flashlight to watch the Molls

The Molls are molecules—hydrocarbon molecules in the gasoline—oxygen molecules in the air

If they get together there are consequences

The consequences are gumbugs—and trouble

No molecular spooning when the Chemical Cop is on the job

He really works for you for nothing for he saves you more than he costs*

*If the job is too tough for the cop, call the Chemical Sergeant He can handle any job

Universal Oil Products Co
Chicago, Illinois

dP

Dubbs Cracking Process
Owner and Licensor

Copyright 1938, Universal Oil Products Co

MECHANICALLY PERFECT!

-WITH ALL THE FEATURES YOU REQUESTED!

HERE is the pump with not just one wanted feature but *all* the features you purchasers of fine pumps requested. A year ago, before this sensational pump was designed, we asked you what you wanted. "Build us a pump," you said:

"**THAT** is Easy to Install—

"**WITH** a Design so Unique that its Sheer Beauty will draw new trade—

"**THAT** has a Pump Housing Completely Waterproof, Practical in Design for Vitreous Enamel Finish and shows no unsightly screws or raw edges—

"**THAT** allows Easy Access to lights, switches, and to all moving parts—

"**THAT** is Accurate and Dependable in operation and meets with the Continual Approval of Sealers—

"**WITH** increased Advertising Space without the use of auxiliary advertising mediums—

"**THAT** will Positively Indicate Flow at all speeds of delivery—

"**WITH** draft-type Ventilators (protected by bug screens) designed to overcome sweating—

"**BUT ABOVE ALL** —build us a pump that is more Economical in Operation—Cuts Down Current Consumption, Lessens Loads on the Pumping Unit, Belt and Motor, and Reduces Flow Friction!—

"**THAT** is Sturdy and Long Lived—

"**THAT** is Backed by an Efficient, Widespread Sales and Service Organization."

Here it is—the pump you asked us to build—with the new National "*Energized*" Power Unit and every other wanted feature.

Write for details and beautifully illustrated catalog just off the press.

THE NATIONAL PUMPS CORPORATION

Factory, Dayton, O. • • *Executive Offices*, Cincinnati, O.

NATIONAL

COMPUTAPEX A-38

KNOW YOUR STATION THROUGH AN NPN INSPECTION

	Yes	No
Is entrance to ladies rest room easily identified from a car at the pump island?	☐	☐
Are rest rooms well ventilated?	☐	☐
Are wash bowl and toilet flush tank brackets securely fastened to the wall?	☐	☐

NOTES .....

Your Rest Room Score

Total questions asked 18

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{18} = \ldots\ldots\ \%$$

LUBRITORIUM (excluding lifts)

	Yes	No
Have grease and oil spots and stains been removed from lubritorium floor?	☐	☐
Is floor cleared of empty cans, tools, waste paper or dirty rags?	☐	☐
Are hi-boys freshly painted and clean?	☐	☐
Are hi-boys neatly arranged and readily accessible?	☐	☐
Is canned oil neatly arranged and readily accessible?	☐	☐
Is repair bench cleaned off when not in use and are tools arranged in an orderly manner?	☐	☐
Is there a rack for repair tools?	☐	☐
Is lubritorium supplied with the correct number of grease guns for specialized lubrication, including guns for universal joints, steering gear, wheel bearings, water pumps, chassis, and a suction gun and oil gun?	☐	☐
Are control valves and swivel joints of grease guns in good condition, with no lubricant leaks?	☐	☐
Is a grease gun rack provided, and is it used and kept clean?	☐	☐
Are nozzle valves on hi-boy pumps free from leaks?	☐	☐
Is packing on the crank or operating lever of hi-boy pump in good condition, showing no signs of wear?	☐	☐
Are hi-boy pipe joints free from leaks?	☐	☐
Are hi-boy tank seams free from leaks?	☐	☐
Are hose connections and nozzles of grease containers free from leaks?	☐	☐
Do grease containers deliver a full stroke measure? (Check with pint or quart container)	☐	☐
Are quick couplers used to connect air hose to air-operated greasing equipment in good condition, showing no signs of leaks or of being damaged?	☐	☐
Are car charts used by attendant in lubricating cars?	☐	☐
If portable grease container cabinets are used, do they roll easily?	☐	☐
Is a convenient space provided for grease container cabinets?	☐	☐
Are surfaces of grease container cabinets in good condition, not chipped, broken or dented?	☐	☐
Is a service stand provided for the convenience of attendant in keeping a record of current jobs, and is it conveniently located?	☐	☐
Are grease containers and guns kept filled with proper lubricants?	☐	☐
Is crankcase drain tank clean?	☐	☐
Is crankcase drain tank free from leaks?	☐	☐
If tire rack is provided, are its fastenings and supports tightly connected and solid?	☐	☐
If a lubrication pit is used, is it clear of oil, grease, rags or other rubbish in the bottom?	☐	☐
Are non-skid treads provided on steps leading to bottom of lubrication pit?	☐	☐
If pit is outside, is it covered or roped off at night?	☐	☐

NOTES .....

Your Lubritorium Score

Total questions asked 29

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{29} = \ldots\ldots\ \%$$

LIFTS

	Yes	No
If lift is fitted with an oil plug on top, is the plug removed every week and level of oil checked? (Should be filled with a light oil to the point indicated, or to within 6 or 8 inches of the top, and should be maintained at this level at all times)	☐	☐
Is oil and grease wiped off platform immediately after each job?	☐	☐
Is lift equipped with an auxiliary jack attachment to lift body weight off springs and shackles?	☐	☐
Are hinge pins of lift ramps in good condition?	☐	☐
When full air pressure is on, is the base of the plunger free from oil leaks?	☐	☐
When lift is raised, is there only a moderate amount of oil on the plunger?	☐	☐
Have oil leaks been eliminated through the gland bolt holes and outer rim of gland flange? (A leak at these points usually indicates a casing gasket needs replacing)	☐	☐
Is head of lift quiet when it is raised? (A sizzling sound here probably means that fill gasket on top of plunger needs replacing)	☐	☐
Is free wheel lift equipped with latest type front and rear axle supports to accommodate new cars?	☐	☐
When lift is down is the oil level up to the gauge mark in the power unit reservoir?	☐	☐
Will lift raise in 30 to 40 seconds?	☐	☐
Are fittings and pipe unions free from leaks?	☐	☐
Is oil reservoir free from leaks?	☐	☐

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Modern lubrication service demands that the attendant have adequate light while working under the car. One such type of lighting equipment is shown at this Mid-Continent Petroleum Corp. station

ations which is afforded in the twin island layout.

A station provided with one triple island can service two cars at the same time, according to this company, while the same station equipped with two twin islands can service four cars, a 100 per cent increase in possible service with only a 33 per cent increase in pump equipment.

GASOLINE pumps are being made in shapes and designs to harmonize with many different styles of station architecture. Pumps that include a built-in display cabinet continue in popularity. Gratifying to the pump manufacturers, too, has been the reception accorded the pump with an island light mounted on its top. Globes have disappeared from most of the newer pumps, in favor of glass panels. One pump manufacturer hit on the idea of inserting a "Drive Safely" message on these glass panels when shipping the pumps from the factory. The idea has caught on, and now there is quite a demand for these panels, according to this company.

The arrangement of units in the newer dispensing pumps is being greatly simplified, with the view in mind of reducing the amount of piping and connections. For example, one pump manufacturer is cutting down the use of pipe by directly connecting the pump casing to the air eliminator casing. The air eliminator, incidentally, is becoming more than just what its name implies. In one case, at least, it aids in relieving the pressure in the hose.

One large oil company recommends that storage tanks for fast-moving products should never be less than 1000 gallons, and that in most instances a 2000-gallon tank should be used. For slower moving products, a 550-gallon tank may be used, according to this company. It is pointed out that a separate tank for each pump is not always necessary, this being more a problem for each individual location.

It is recommended that tanks be installed perfectly level and completely surrounded with sand to keep away any earth that may be corrosive or may have cinders in it and to prevent settling. The tank should be buried so its top is at least 3 feet below the ground level.

Following are storage tank dimensions which one oil company recommends:

2000-gal. tank—12 feet long by 4 inches diameter.

1000-gal. tank—6 feet 1 inch long by 5 feet 4 inches diameter.

550-gal. tank—6 feet 1 inch long by 4 feet diameter.

Oil companies are showing an increasing interest in the time required to unload gasoline from the tank truck at a service station. To speed up unloading, some companies have adopted a hose fitting which makes a tight connection at the fill cap, thus increasing the head and speeding up the flow. More companies are changing to a 3-inch fill pipe, and in some few cases 4-inch fill pipes are reported in use.

Suction lines and suction stubs, in general, are 1½ inches in diameter, although 2-inch suction lines are used to some extent. Although 1-inch and 1½-inch vent lines are generally used, some believe that larger diameters would be more efficient where larger fill pipes and faster tank filling methods are used.

FOOT valve and check valve extractor fittings are now used almost entirely in new installations, and in many cases in replacements. These fittings make it possible to remove the valve without having to dig up the pipe.

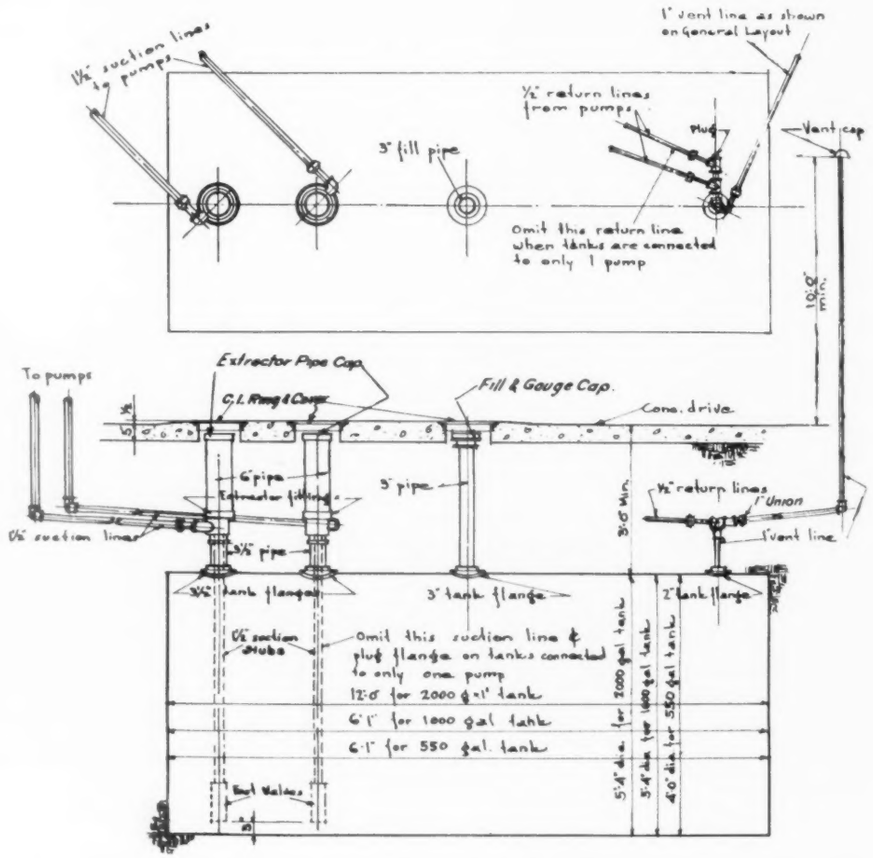
One valve equipment manufacturer lists the following suggestions to aid in the proper installation of his equipment.

(1) Wash valves in clear water prior to installation, as an extra precaution against dust or foreign particles getting onto the seats.

(2) Pipe lines should be thoroughly cleaned and all burrs removed.

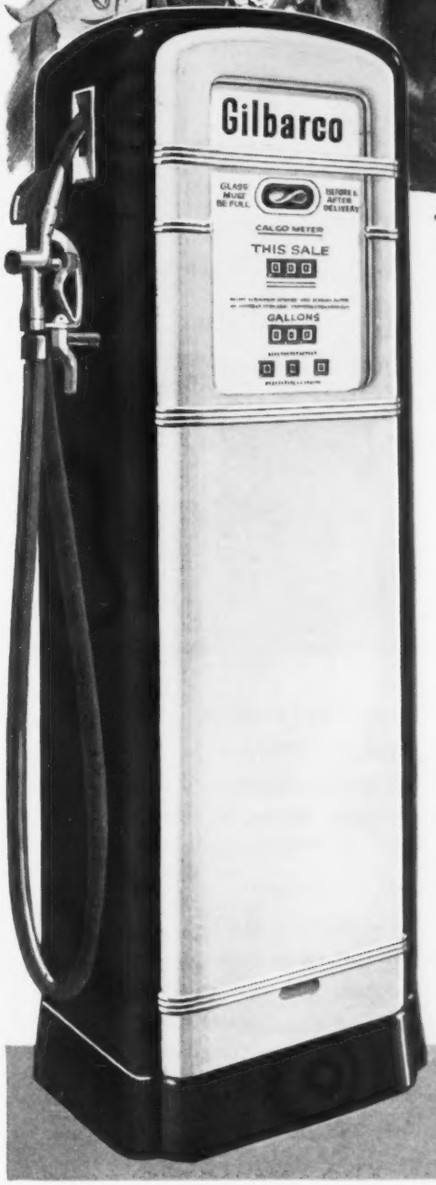
(3) Care should be taken in the use of litharge and shellac on pipe joints. If too much is applied, the excess may drop on the valve seat and spoil it.

(4) All lines should be well capped


1" vent line as shown on General Layout
1½" suction lines to pumps
½" return lines from pumps
Plug
Vent cap
3" fill pipe
Omit this return line when tanks are connected to only 1 pump
10'-0" min.
To pumps
Extractor Pipe Cap
C.I. Ring & Cover
Fill & Gauge Cap.
Cone. drive
6" pipe
Extractor fitting
3" pipe
½" return lines
1" Union
1" vent line
3'-0" Min.
0½" suction lines
3½" pipe
3½" tank flange
3" tank flange
2" tank flange
0½" suction stubs
Omit this suction line & plug flange on tanks connected to only one pump
12'-0" for 2000 gal. tank
6'-1" for 1000 gal. tank
6'-1" for 550 gal. tank
Foot Valves
5'-4" dia. for 2000 gal. tank
5'-4" dia. for 1000 gal. tank
4'-0" dia. for 550 gal. tank

A typical gasoline storage tank installation as specified by the Shell Petroleum Corp., St. Louis, Mo.

SMASHING ALL RECORDS!



Gilbarco's Newest Calco-Meter "96"

All Quiet on the Island Front. The Calco-Meter 96 smashes all records in smoothness of operation . . . Sets a new high in vibrationless performance.

There's good reason why . . . It has the greatest rigidity ever built into a pump. Hence, less vibration.

What's more, it *purrs on rubber cushions* . . . Actually, principal mechanical parts are mounted on rubber.

One Man Hook-on Panels. It's marvelously easy to make adjustments. Front and rear panels are independent of the rest of housing. No bolts. No screws. No fuss. No bother. Just slip them off the hooks to remove—or replace—them.

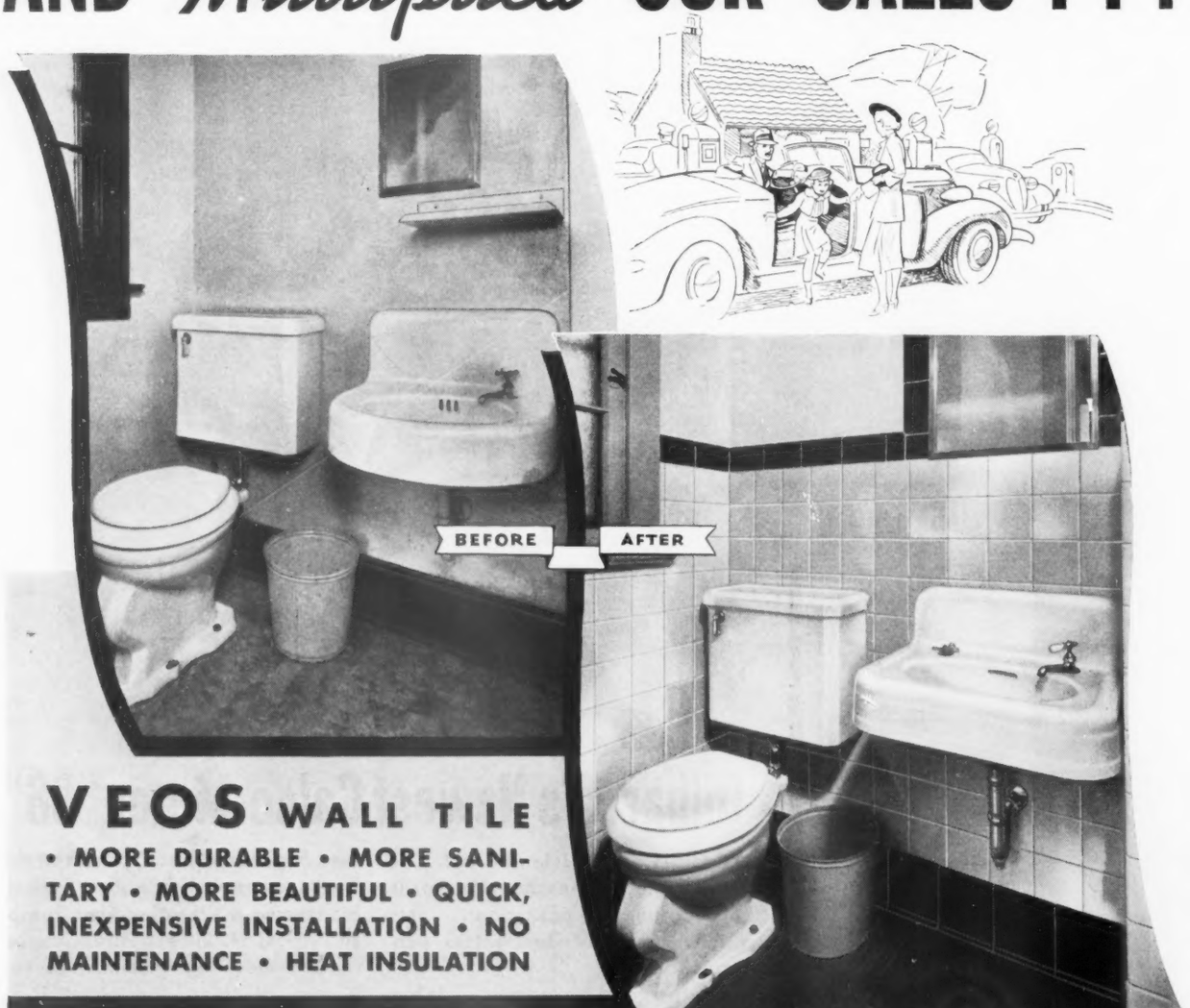
Pioneering a Vibration-Free Pump. In 1865, C. N. Gilbert, Hiram Maxim (later famous as inventor of the Maxim Machine Gun) and J. F. Barker pioneered the development of a gas machine.

Animated by the same pioneering spirit today, Gilbert & Barker designed the Calco-Meter 96. It reduces vibration to the vanishing point . . . and has a streamlined arrangement of working parts which makes servicing easy and quick. Write today for Bulletin 96

GILBERT & BARKER MANUFACTURING CO.

SPRINGFIELD, MASS. TORONTO, ONT., CANADA

WE *Modernized* OUR RESTROOMS AND *Multiplied* OUR SALES . . .



VEOS WALL TILE

• MORE DURABLE • MORE SANITARY • MORE BEAUTIFUL • QUICK, INEXPENSIVE INSTALLATION • NO MAINTENANCE • HEAT INSULATION

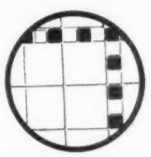
Veos Insulating Foundation Board is nailed on over the old wall.

Veos Glue is applied to the back of each Tile.

"It's really surprising how many people make a habit of stopping at stations that have nice restrooms . . . Girls, men alone and parents with children . . . There's certainly something inviting and reassuring about glistening restroom walls of Veos Tile . . . It provides a great opportunity for an oil man to get the goodwill and esteem of the motoring public" . . . The above is a quotation from a letter received by one of the major oil companies . . . Veos Tile can be installed right over the old restroom walls and it's absolutely permanent in every respect. Veos has the same beautiful, glossy surface as conventional clay bodied tile but Veos has a heart of steel and cannot crack, craze or sweat. Its glistening porcelain surface can be cleaned as easily as china and will attract the right kind of trade . . . Let us give you a quotation on a few sample installations and we will submit proof of results based on installations made for other leading oil marketers. Address:

DAVIDSON ENAMEL COMPANY • CLYDE, OHIO

Veos Tile is inserted in grooved pattern in foundation board.



Grouting ornaments and waterproofs the joints.

KNOW YOUR STATION THROUGH AN NPN INSPECTION

	Yes	No
If electrically operated, are motor brushes and commutator free from dirt?	☐	☐
Have electric motor bearings been lubricated in the last 6 months?	☐	☐
Has bottom of oil reservoir been pumped out to eliminate any accumulated water?	☐	☐
Is every bolt on the lift tight?	☐	☐
Is each lift equipped with at least 2 stop blocks?	☐	☐
Is lift piston in alignment?	☐	☐
Are runways free from deflection under weight of average car?	☐	☐
Does lift rotate freely, if not equipped with non-rotating device?	☐	☐
If a grease fitting is provided in the top ring of the packing gland, is it lubricated once a month with a water pump lubricant?	☐	☐

NOTES .....

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Your Lift Score

Total questions asked 22

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{22} = \text{..... \%}$$

LIGHTING

	Yes	No
Are all reflectors clean?	☐	☐
Are all lamp bulbs in good condition?	☐	☐
Is lighting evenly distributed over ground areas?	☐	☐
Are floodlight poles hinged to permit easy access to lamp and reflector?	☐	☐
Are floodlights and other high-powered lights shielded so as not to glare in eyes of oncoming motorists?	☐	☐
Is each lighting outlet supplied by a separate conduit and wiring to provide greater flexibility?	☐	☐
Are 500 or 1000-watt lamps used in floodlights?	☐	☐
Are floodlight poles at least 20 feet high?	☐	☐
Are 300 to 500-watt lamps used to illuminate pump island?	☐	☐
Are pump island lights at least 12 feet above the ground level?	☐	☐
Are 200 to 300-watt lamps used in ceiling fixtures inside station?	☐	☐
If more than one ceiling light is used, are they spaced on centers more than 1½ times the mounting height above the floor?	☐	☐
Are display window reflectors mounted on 12 to 18-inch centers and fitted with 75 to 200-watt lamps?	☐	☐
Are lift or pit lights provided?	☐	☐
Have you ever had the local power company check the light distribution at this station with a light meter?	☐	☐

NOTES .....

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Your Lighting Score

Total questions asked 15

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{15} = \text{..... \%}$$

FIRE EXTINGUISHERS

	Yes	No
Is fire extinguisher located just inside door of station office?	☐	☐
Is fire extinguisher located just inside bay entrance of enclosed lubritorium?	☐	☐
If carbon dioxide extinguisher is used, is it located with bottom about one foot above the floor?	☐	☐
If carbon tetrachloride extinguisher is used, is it mounted on wall with top not more than 5 feet above the floor?	☐	☐
Are extinguishers filled to capacity?	☐	☐
Are orifices of nozzles clean and open?	☐	☐
Is each extinguisher inspected at least once a year for proper operation, in accordance with Insurance Underwriters' requirements?	☐	☐
Is the weight of the carbon dioxide extinguisher less than 10 per cent below the weight stamped on the nameplate or valve?	☐	☐

NOTES .....

.....

.....

Your Fire Extinguisher Score

Total questions asked { 6 if carbon tetra. exting. is used / 7 if carbon dioxide exting. is used

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{\text{Total questions asked}} = \text{..... \%}$$

AIR COMPRESSOR

	Yes	No
Is air compressor located where noise will not interfere with conversation in station?	☐	☐
If maximum working pressure is under 150 pounds, is single stage compressor used?	☐	☐
If maximum working pressure is over 150 pounds, is two-stage compressor used?	☐	☐
Is drain cock on underside of compressor tank opened once a week to blow off accumulated moisture?	☐	☐
If compressor unit is equipped with a moisture trap, is it drained once a week?	☐	☐
Is flywheel rotating in right direction, so as to direct air onto compressor?	☐	☐
Is oil level kept up to mark indicated on gauge?	☐	☐
Are safety valves free from leaks?	☐	☐
Do safety valves operate freely?	☐	☐
Is oil changed twice a year?	☐	☐
Is belt tension adjusted to allow about ½-inch deflection?	☐	☐

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until the final installation is made, to keep out dust and dirt.

(5) In installing fill boxes, they should be raised about ½-inch above the level, with concrete running up to the top of the box to prevent water standing in the lids. This will prevent water getting into the tank when the lids are opened.

One helpful piece of equipment for use on the bottom end of the suction stub in the tank is the water locking valve, which remains open when gasoline is passing through, but closes automatically when water starts to pass through. This type of valve takes advantage of the difference in specific gravity of water and gasoline and centers around a specially weighted float which is calibrated to sink in gasoline but float in water.

THE past two years have seen a tremendous increase in the attention given to lubrication service as a primary profit item at the service station. Oil companies, in their contacts with dealers, emphasize the possibilities in lubrication not only as a profitable item in itself, but as a means to uncovering sales prospects for replacement and accessory items.

Enclosed lubritoriums have proven more successful in pulling in business than the open or yard type lift or pit. Consequently the enclosed type has grown in popularity the last year.

Lubrication equipment manufacturers, not being content to follow the lubrication parade, in many cases have led it, with the introduction of equipment that makes possible a faster and more thorough job. Compressed air has made possible many new developments in dispensing equipment for the lubritorium.

Probably the most recent development of this kind is the "centralized" lubrication layout. Here the stationary lubricant containers, streamlined, beautifully finished and chromium plated, house the oil company's 25 and 100-pound drums. Air pressure exerted on the chassis lubricant drum forces the lubricant through a tube to the ceiling over the lift where a swivel arm and drop hose put the nozzle within quick and easy reach of the attendant at all times.

Beside the lift are two metered lubricant posts, each with a hose extension and control nozzle. These outlets are for the two types of gear lubricants and are metered for accurate measurement. The air hose attachment is quickly attached to the gear lubricant drum desired, and the dispenser is ready for operation. The nozzle on the hose controls the discharge rate.

Portable lubricant dispensers are also available, finished in new car brilliance. These are also air operated, and require only the attachment of the air hose to put them to work.

A new development in lubricating oil dispensers has found its way into a few stations. This consists of a rack on which is mounted a faucet. Drums of lubricating oil enclosed by a special type of seal are placed seal down on this rack, much the same as a ten gallon water bottle is placed in a dispenser. The seal is then cut by the receptacle into which it fits in the rack and the oil allowed to flow to the faucet where it is ready to be drawn off when wanted.

Precision equipment is the order of the day at modern stations. Air tower gauges are being built to maintain their accuracy, gasoline dispensing pumps measure the last drop; gear lubricant dispensers are accurately meterized; lifts, air compressors, grease guns, are all precision-built.

At least two ingenious equipment manufacturers have developed a smart promotion idea to sell their products. These are in the nature of sales campaigns built around the piece of equipment, but designed to sell the service which the equipment is used for. For example, one manufacturer of lubrication equipment has developed a campaign to promote Floating Body Lubrication in connection with a lift attachment which raises the weight of the engine and body off the car springs to permit a more thorough lubrication job. With the purchase of this auxiliary equipment, this company offers free one banner for the station, two buttons for the attendants to wear, and 300 mailing cards. Newspaper ad mats can also be purchased from this company at a nominal price for further promotion of Floating Body idea.

In another field the manufacturer of tire inflators is about to launch a promotion program which will be offered to station operators who use that equipment. This campaign will glorify the need for proper tire pressures, and will show the high cost of running on under-inflated tires. The object of the campaign, of course, will be to get the motorist into the station . . . . and to sell tire inflation equipment, which it should do.

There need be no concern about initiative and progress in the field of service station lighting. Research departments of the lamp manufacturers are thinking far into the future, and service stations are just now beginning to adopt certain types of lighting that have been developed commercially for quite a few years now.

The mercury vapor lamp and the sodium lamp are two such types. The sodium lamp, giving off a yellowish color, has not yet been widely adopted because of its comparatively high initial cost. The mercury vapor lamp, however, is gaining popularity. It gives off a light which resembles daylight, and which some call "white" light. Technically, however, it is not white, but the combination of blue and yellow green, which creates a whiter sensation to the observer.

OIL companies have evidenced an interest in lighting that would produce a daylight effect at the station, and because of this the work of lighting research engineers may be of more than passing interest. While most metallic vapor lamps give off only a restricted number of wave lengths of light, or a limited number of colors, sunlight includes all the colors of the rainbow or spectrum.

Now it has been found that the vapor of a rare metal, tellurium, with an odor something akin to garlic, gives a continuous spectrum similar to sunlight. The commercial possibilities of this type of vapor in lamps have not yet been fully determined.

Another new development is the use of mercury vapor under pressure. This type differs from the present commercially available mercury vapor lamp in that an intense white light is developed, whereas in the type now used the light is bluish-white with a high percentage of ultra-violet light.

If scientists achieve their present ambitions, service stations will someday be illuminated with cold light, a type in which all energy will be converted into light and none lost in heat. Cold light has been developed experimentally in the laboratory, but as yet it is not near the point where it would be commercially practicable.

But with all these developments in the offing, the modern service station still has a fortunate choice when it comes to available lighting equipment. Light distribution at service stations has reached micrometric propor-

Advertisement

It's Safer To Have Twins

See Pages 52-53

KNOW YOUR STATION THROUGH AN NPN INSPECTION

	Yes	No
Is space around compressor clear of rubbish or stock?	☐	☐
Is compressor belt in good condition, showing no signs of fraying?	☐	☐
Are contacts of electrical control switch clean?	☐	☐
Have control springs, which govern cut-in and cut-out pressures, retained their tension?	☐	☐
Do brushes and commutator of motor make clean contact?	☐	☐
Are motor bearings oiled every 3 months?	☐	☐
Are air intake muffler and screens clean?	☐	☐
Are manifold valves, piping, and fittings free from leaks?	☐	☐
Is compressor firmly mounted on its base?	☐	☐
Is motor fastened firmly to its base?	☐	☐
Is oil in compressor changed every 30 days?	☐	☐

NOTES .....

Your Air Compressor Score

Total questions asked 22
Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{22} = \ldots\ldots\ \%$$

AIR SERVICE OUTLETS

	Yes	No
Are pipe, fittings, and union at base of air stand free from leaks?	☐	☐
If air stand is equipped with a needle valve, is valve free from leaks?	☐	☐
Is coupling between air stand and hose free from leaks?	☐	☐
Does gauge register accurately?	☐	☐
Is screen clean on air inlet side of gauge?	☐	☐
Is air stand solidly mounted on base?	☐	☐
Does hose reel wind and unwind freely?	☐	☐
Is air stand freshly painted?	☐	☐
Is air stand placed where it will not interfere with flow of traffic through station drives?	☐	☐
Are air lines blown out each morning and evening?	☐	☐

NOTES .....

Your Air Service Outlet Score

Total questions asked 10
Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{10} = \ldots\ldots\ \%$$

HEATING SYSTEMS

	Yes	No
Are radiators free from leaks?	☐	☐
Has dust and dirt been cleaned from between radiator sections?	☐	☐
Are radiator valves free from leaks?	☐	☐
Are air vent valves free from leaks?	☐	☐
Do air vent valves seat properly and operate freely?	☐	☐
Are steam line traps clean?	☐	☐
Are pipes and fittings free from leaks?	☐	☐
Are suspension brackets of unit heaters secure?	☐	☐
Is the unit heater motor oiled regularly?	☐	☐
Is unit heater fan tight on shaft?	☐	☐
Are unit heater core tubes free from leaks?	☐	☐
In hot air systems, are air ducts tight and hangers securely fastened?	☐	☐
Are hot air registers clean?	☐	☐
Is blower fan tight on shaft?	☐	☐
Is blower fan belt in good condition?	☐	☐
Is blower motor oiled regularly?	☐	☐
In oil burner stove, are holes in mixing chamber open?	☐	☐
Have soot and carbon been cleaned from inside of stove and chimney?	☐	☐
Are oil lines and tank strainer screen clean?	☐	☐
Are float valve and oil adjusting valve of gravity control assembly working properly?	☐	☐

NOTES .....

Your Heating System Score

Total questions asked { 7 if steam radiator system; 4 if unit heater system; 5 if hot air system; 4 if oil burner stove }

Total "Yes" .....

$$\text{Score} = \frac{\text{Total "Yes"} \times 100}{\text{Total questions asked}} = \ldots\ldots\ \%$$

HOW TO GET YOUR COMPLETE SERVICE STATION SCORE

(1) Determine the total question asked, by adding together the "Total Questions Asked" figure from each section of this inspection form.

(2) Get the total "yes" answers, by adding together the "Total Yes" figure from each section of this inspection form.

Grand Total of Questions Asked .....
Grand Total of "Yes" Answers .....

Complete Service Station Score =

$$\frac{\text{Grand Total of "Yes" Answers} \times 100}{\text{Grand Total of Questions Asked}} = \ldots\ldots\ \%$$

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tions, and between the electrical equipment manufacturers and the local power companies, information and materials are available to correctly illuminate any station.

Floodlights are available with reflectors shaped to distribute light only where it is needed. Hinged floodlight poles simplify the servicing operation. Pump island lights help to spotlight the pumps and provide a "target" for the motorist as he enters the station. Lights are available for illuminating the under side of the lift, and can be had in types that are attached to the lift and which are set flush with the floor or side walls.

A combination island light and floodlight has been developed by one equipment manufacturer which is particularly adaptable where the light source is located close to the building. The floodlight is mounted directly on top of the island light reflector and uses a 200-watt lamp. Larger floodlights, usually at lot corners, ordinarily require lamps up to 1000 watts for the same purpose.

There are many evidences of how lighting increases business. At a station in Iowa, for example, the operator decided to go after night lubrication business by making the station a blaze of light. Lubrication facilities and drives were given added brilliance with large lamps, and dark corners were filled with light. The result was that lubrication trade immediately increased 10 per cent. The increased illumination also attracted women customers to the lubritorium, which is business which this station claims it would not have obtained if the place had been dark and dingy.

One large oil company in the middle west points out that a well-lighted station will easily attract more than one extra customer per hour, and that the profit from this additional business will more than offset the extra current used.

An example of the false economy of poor or insufficient lighting was pointed out recently in the experience of a construction superintendent for an oil company operating in the middle west. At a newly constructed and equipped station this man found that the only lights visible on approaching the station were two island lights and lights in the pump globes. Three 25-watt lamps were burning in the office bay window, where there should have been three 100-watt lamps. Two office ceiling lights, each 100 watts, were unscrewed from their sockets, and an additional two 100-watt bulbs in the center mounted sign were not burning. Neither was a 750-watt floodlight.

This engineer then explained that the reduction in wattage, according to his figures, was 1275 watts, and that on the basis of standard rates in effect throughout the middle west, the saving which this station operator was making on lights amounted to less than three cents per hour.

It was pointed out that, had all of his lights been on, this operator would have paid for his lights if only one additional customer per hour was attracted to his station.

The Shell Union Oil Corp. makes the following general recommendations for station lighting:

"General station yard illumination is usually best obtained by the use of flood lights with 500 or 750-watt lamps, and even 1000-watt lamps may be desirable and economical. These fixtures should be mounted 25 feet high, and two to six such units may be required to properly light the pump islands, the building and the entrance drives. Small yards, where the light projection does not need to exceed 70 feet, may be well lighted with open type floodlights. For lighting at longer distances, the enclosed type floodlight with properly designed reflector, lamp, and lens, is more satisfactory. Avoid pointing floodlights towards drives and traffic. Pump islands should be lighted from two directions to eliminate shadows.

"Air and water towers equipped with drum type globes should have 60-watt lamps to make them readily visible."

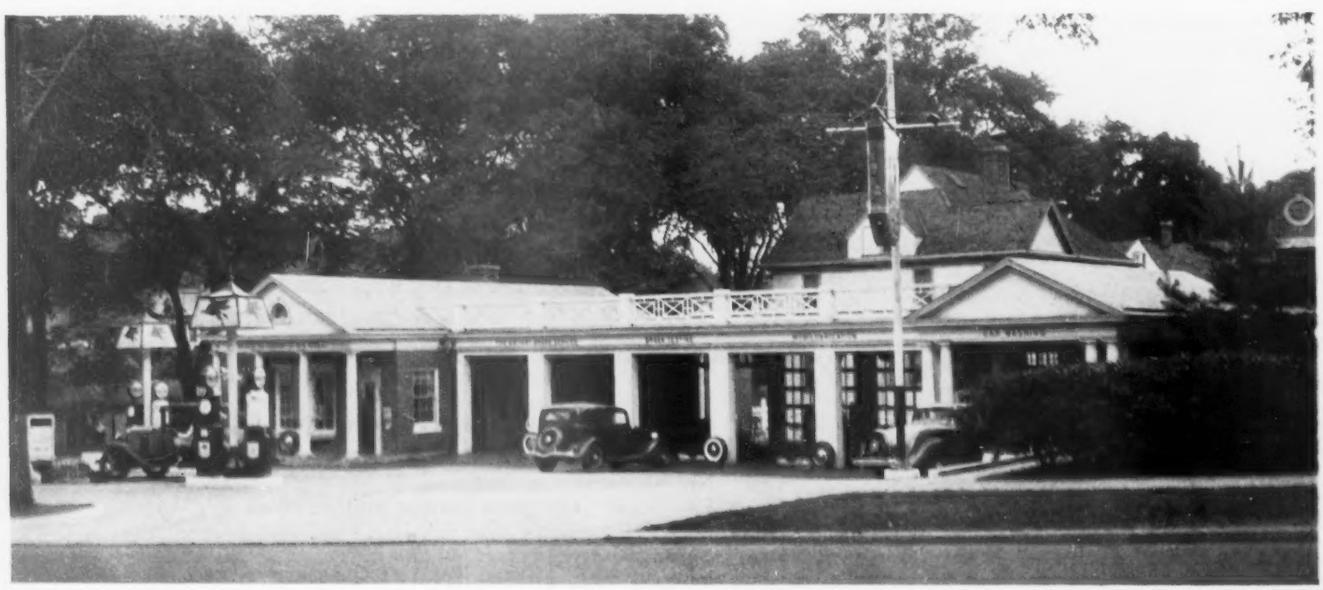
Shell also points out that special reflectors should be located under the lift or in the pit to provide ample light for the attendant. At these points 100-watt lamps are recommended. In the offices, semi-indirect fixtures are suggested, using 100-watt lamps. In the rest rooms, a 60-watt lamp is recommended.

The present tourist season finds an increasing number of oil companies using the clean rest room theme as a means of pulling in customers. Authorized rest rooms, approved rest rooms, registered rest rooms . . . . all of these phrases are finding their way into the the advertising campaigns of large oil companies.

It is no longer necessary to prove that a clean rest room is one of a station's most outstanding business builders. With the federal government's current drive against syphilis making the nation more conscious of filth and dirt, the service station rest room that is untidy puts itself directly in the path of unfavorable public opinion.

The rest room should be provided with soap, clean towels, toilet tissue, mirror, and a hook and lock on the door. Wash stand and toilet should be kept clean and in good repair. The toilet seat should be well painted and clean. Floors, walls, and ceiling should be well painted and clean, and all rubbish and unnecessary stock or clothing removed from the room. Care should be taken to see that the rest rooms are properly ventilated and that they smell clean.

Probably the Iowa Plan has had a pronounced effect in bringing the modern service station back to earth and to simplicity. Whatever the reason, the fact remains that the spires, steeples and alleged Gothic architecture are gone, and in their place has come the plain but impressive station, built first for customer convenience. And in the rule book of modern station operation, cleanliness is one of the first requirements—cleanliness from rest rooms to curb signs.



Located at White Plains, N. Y., this outlet of Mayflower Stations, Inc., is a good example of a station designed to blend into the residential setting

SOWING A WIND AND
REAPING A WHIRLWIND . . .
of business
IT GETS THEM IN AND TURNS
THEM OUT . . . SATISFIED CUSTOMERS
U. S. Silver Scout Chassis Lubricators are entirely different from anything ever developed in high pressure grease guns. • No air leaks, that's one thing U. S. engineers have licked. Air leaks are more expensive than water leaks because your air compressor is forced to work longer, which costs money, in time and excessive electric bills. • U. S. Silver Scout Lubricators are absolutely "Air Tight" which means you can turn out more work, better work, and make a bigger profit. • Container holds an original 25 lb. grease pail or 65 lbs. in the bulk.
SELLS FOR ONLY
$98.00

THE UNITED STATES AIR COMPRESSOR CO.

CAR WASHING SYSTEMS
AIR COMPRESSORS

CLEVELAND, OHIO, U. S. A.
AIR TOWERS

GREASING EQUIPMENT
HYDRAULIC LIFTS

Steps In Erecting A Modern Station

The exterior walls are wall bearing, with the columns and beams providing intermediate support to the roof deck. Wall panels are bolted to beams at the roof line

Laying the roof deck. This deck is composed of long span metal roof panels. Waterproofing applied over this is multiple-ply, built-up waterproofing, laid over an insulating board

Here a pre-fabricated wall panel goes into place, raised by one man. These panels are made of steel channels, filled in on the interior face with flush-type panels of furniture finish steel sheets

Here the porcelain enamel panels are being fastened to the wall units by a method which leaves no hooks or fastening protruding

Filling in the insulation. Panels are backed by insulating material. This material is applied in the air space between the inner and outer panels

A completed modern service station of steel, porcelain enamel and plate glass. A trim unit, well lighted, and with good visibility from within

Cost of Building and Equipping Two Types of Service Stations

THE data presented in this article is based entirely on the facts and figures taken from the records of a large oil company operating stations in many parts of the country. This article, written by an engineer for this oil company, gives specifications for buildings, driveways, and equipment for two types of service stations.

It should be noted that material and labor costs as presented here are on a basis of rates in a large city, and are from a fourth to a third higher than the same standards would call for in many districts.

This company estimates its minimum investment in a small neighborhood station would be $7200 for the building and drive; $3175 for the equipment, and $500 additional for engineering plans, supervision, permits, etc., a total of $10,845.

The company's estimate for a building and driveways for the large station with three lubrication bays is $15,000; for equipment $4640, and additional expenses $600, making a total of $20,240. The company's specifications for buildings, driveways and equipment for the two types of stations are as follows:

NEIGHBORHOOD STATION

Anticipating 6000 to 10,000 Gallons Volume Per Month

The following type of building represents the utmost for facilities in appearance, durability, minimum in maintenance, cost, building code requirements, squareness of construction to meet dimensions of most any site suitable for service station outlet, desirability of construction, and geographic suitability for all climatic conditions. It permits a maximum in service for the minimum costs:

Size of Building: 25 feet x 26 feet on foundation, and offering the following facilities—

Service station office or sales room, 10 feet x 13 feet.
1-bay lubritorium, 13 feet 6 inches x 24 feet 6 inches.
2 lavatories—ladies and men—5 feet x 5 feet.
1 storage room, 6 feet x 10 feet.

Building of Hard-burned Common Brick Construction: Foundation 3 feet 8 inches x 10 inches concrete, 3 feet deep, 8 inches above grade; floors, concrete finished, 4 inches thick; walls, 9 inches thick, exterior 4-inch common brick, interior 4-inch tile; partitions 4-inch tile, walls and ceilings of sales room, lavatories and storage room to be plastered on metal lath.

Interior of lubritorium walls glazed tile, ceiling plastered. Lubritorium to be equipped with 9-foot x 9-foot glazed panel overhead door. Windows, lubritorium, storage room and lavatories to be steel sash; station salesroom, wood sash. All wood, doors and trimmings to be of soft clear grain pine.

Plumbing: Includes modern fixtures in lavatories, outside wall hydrant, one anti-freeze type hydrant with 12-inch x 12-inch drain. All down spouts to be connected to sewer or drains.

Roof: Asbestos stone shingles 8 inches x 16 inches, standard thickness, laid American method.

Electrical work, fixtures: All work to be in most modern method, with materials meeting all specifications and requirements, 110 and 120-volt, ample lighting fixtures inside of building. Sufficient convenience outlets throughout for use of various electric equipment, light and power circuits to pump island, air compressor, air tower and wherever deemed necessary.

Pump island to be equipped with latest type mushroom lights. All yard lighting to be underground lead covered wire run in ½-inch conduit; light poles with reflector type and modern flood lights to be spotted to give sufficient, attractive, and practical lighting at minimum current consumption. Circuit, pole and neon sign for station or product identification.

Heating plant: To heat station adequately according to climatic conditions, provide for coal, gas or circulating oil heaters. Lubritorium to be equipped with forced airblower gas unit if heated with gas. Lavatories to be equipped with top, bottom wall registers, to allow borrowed heat from balance of station to prevent freezing of water facilities.

Painting: All interior, exterior surfaces to be painted to be properly primed and two finish coats of paint.

Fence: A certain amount of wood ornamental fence to offset station, where station site adapts itself for fencing, ratioed according to size of station, properly painted and trimmed.

Landscaping: Lawn and hardy shrubbery to some extent, where the station site readily lends itself for this purpose. Landscaping to some extent is the most desirable and economical station dressing, ultra desirable in better residential sections to more readily harmonize with surrounding property.

Driveway: A preference service station location is at a two-street intersection, having the advantage of corner influence, serving two traffic arteries. Four 30-foot approaches are most desirable if corner lot and property dimensions are adequate, ingress and egress on both streets. Two 30-foot approaches should be provided in all cases preferably on the main traffic artery where the station is located.

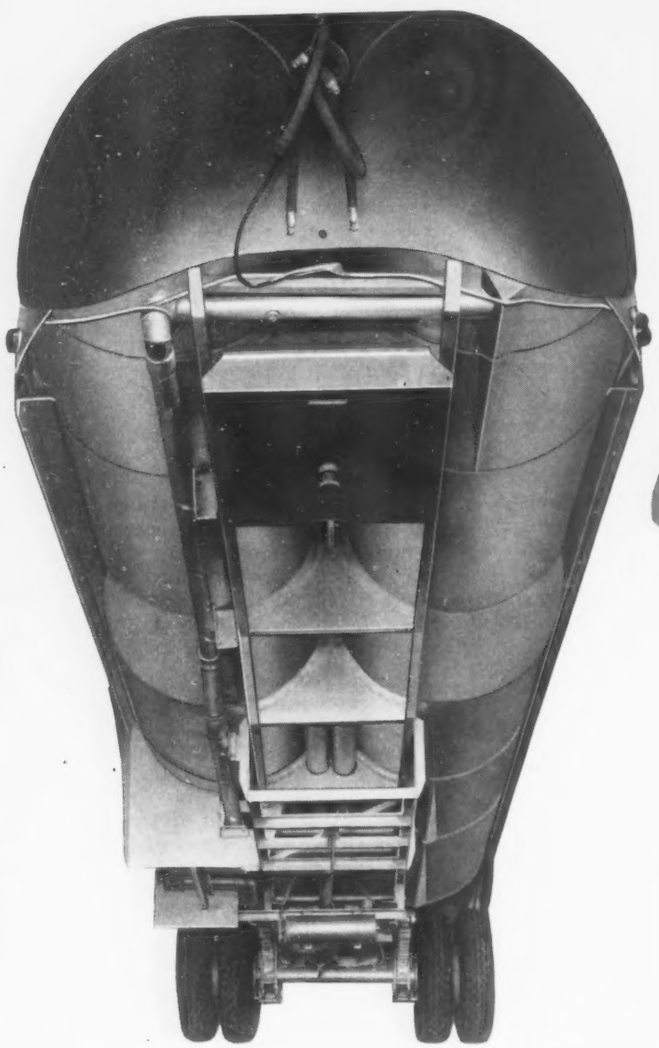
Minimum frontage on corner lot should be at least 80 feet. Minimum frontage on inside lot should be at least 100 feet. Approaches should be installed to provide the maximum radius, to approach the pump service island, eliminating abrupt or jackknife turns, which are looked upon as being hazardous by many motorists. Poor accessibility defeats good locations and modern station buildings and facilities.

Driveway and Driveway Approach Construction: Study is based on 100 feet x 80 feet service station lot of corner location with four approaches.

A newly developed station site, should be subgraded from 8 to 10 inches below proposed grade, providing for stone foundation properly rolled and tamped, surfaced with approximately 4 inches of crushed stone, No. 7 preferably with ¼ to ½-inch white limestone, with a good mixture of ¼ to ½-inch dust limestone for proper binding, properly wet down, rolled and tamped. Approaches should be of concrete construction, either 6-inch reinforced or 8-inch concrete, sectioned and set with proper expansion strips. This is necessary to provide amply for heavy vehicles, and proper allowances for material contraction and expansion factors, due to extreme temperature variations.

Equipment Plus Cost of Installation: The ability and facilities for complete motoring service are desirable and essential for the present day and immediate future service station, necessitat-

It's New! SAFER! R



GREATER ST

with MAXIMUM PA

Greater Safety thr Gre

Several years ago, Butler pioneered in pressure transports. In them hundreds of thousands of gallons of high volatile, casing-head gasoline have been safely carried hundreds of thousands of miles. So, to Butler engineers, the steadily tightening regulations governing regular gasoline transports have presented no cause for alarm. Alert to the increasing demand for greater safety they turned to Butler's time-tested, road-tested casing-head transport design—adapted it to regular gasoline transport service to give the oil industry the protection of greater safety thru greater strength.

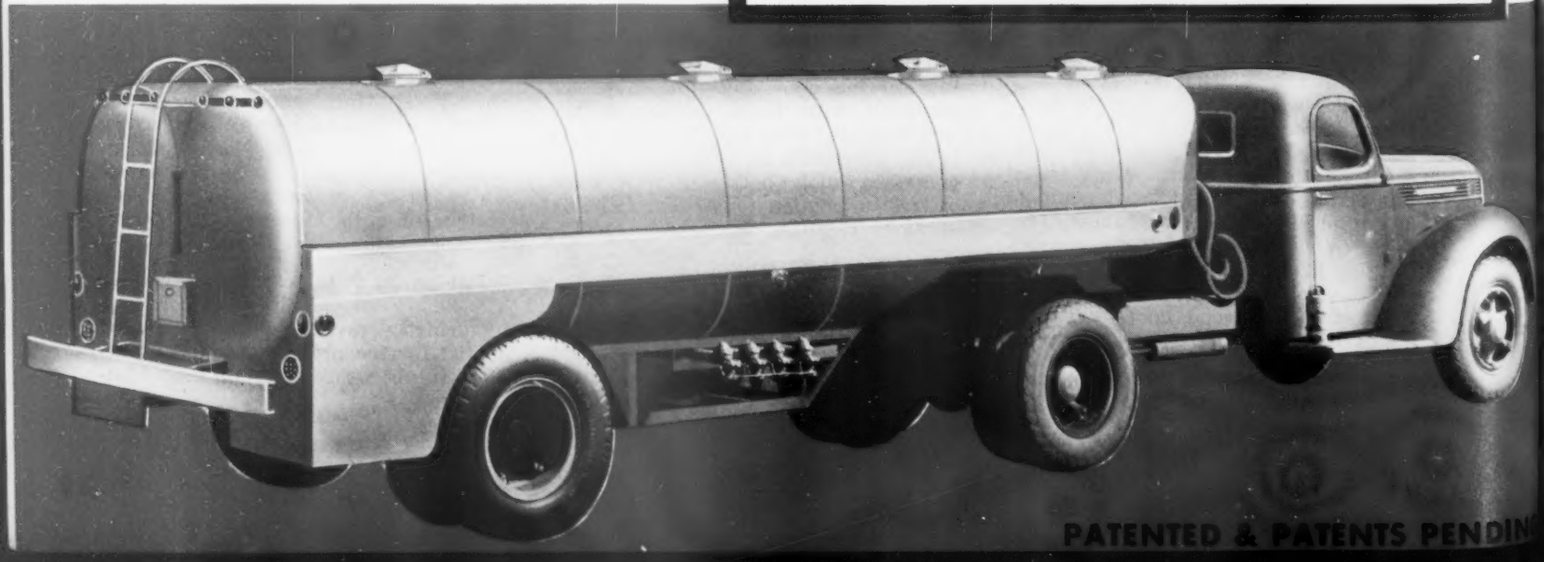
The result is the new Butler Twin-Tank Safety Transport. It is revolutionary.

MANY TIMES STRONGER FOR THE SAME REASON:

AN EGG ON END IS STRONGER THAN AN EGG ON ITS SIDE

ENGINEERED TO MINIMIZE LIQUID LOAD, SHOCK LOAD AND TRAILER LOAD STRESSES

So balanced and integral is the greater strength of the Butler Twin-Tank Safety Transport that no single portion is subjected to excessive stress punishment. The stresses of a liquid load in motion; of road and draw-bar shocks; of the empty trailer load itself—all are distributed on the Twin-Tank Unit as a whole and minimized at all vital points. The twins are both tied together and piped together. The latter equalizes load distribution and facilitates side discharge of all compartments on the curb side. Before you buy any transport, investigate the Twin-Tank.



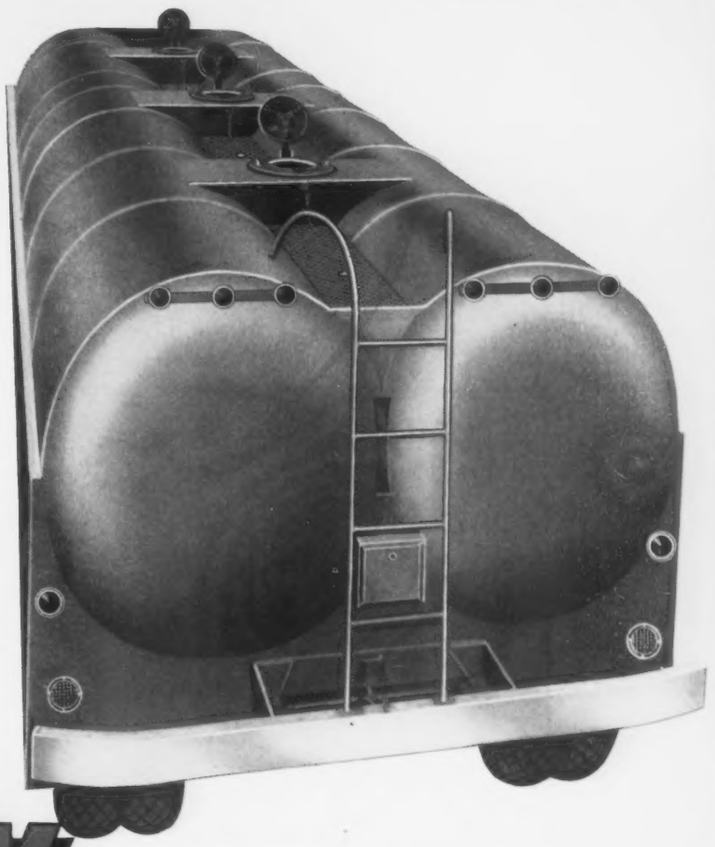
PATENTED & PATENTS PENDIN

REVOLUTIONARY!

STRENGTH

PAYLOAD!

Greater Strength



BUTLER

TWIN-TANK

Safety

TRANSPORT

Twin-Tank design completely discards the conventional oval tank shape. It utilizes a far superior tank shape in upright position—the strong way. It goes further! It incorporates not one, but two tanks of stronger shape. The far greater strength is so obvious that it does not take an engineer to see it. Actually the new Butler Twin-Tank Safety Transport ranges from two to eight times stronger, gives a 20 to 1 factor of safety. Owners who have put Twin-Tank Transports over the road as well as oil company engineers who have investigated them, all say—"Why didn't you do it long ago?"

Greater safety thru greater strength is just a part of the big news. It is accomplished in the Twin-Tank with no increase in deadload. Whether made of hot rolled steel or high tensile steel, Butler's steps-ahead-engineering still gives you the maximum payload, as well as greater strength to carry it safer.

We are interested in weight-saving, more payload, low cost transportation and the more safety along with it the better.

SEND FULL INFORMATION ON

Engineers! Note Carefully!

2 TIMES GREATER VERTICAL SHEAR STRENGTH
3½ TIMES GREATER HOPPER STRENGTH
8 TIMES GREATER CRITICAL BOTTOM STRENGTH
20 TO 1 SECTION MODULUS SAFETY FACTOR

By simple engineering formulae, you can check and double check these greater strength factors of Butler Twin-Tank Safety Transports. We will be glad to send engineering graphs showing the 2 to 1 strength of 4 vertical shells versus 2; the 3½ to 1 hopper strength of 2 narrow hoppers versus 1 twice as wide but of equal depth; the resultant 8 to 1 concentration of critical bottom strength and the 20 to 1 section modulus factor of safety. Engineered into the Butler Twin-Tank are other safety features, such as center fill openings, which prevent spillage down sides of tanks and drainage of spoilage away from motor exhaust. Write today for full information on the safest transport on wheels.

BUTLER MANUFACTURING COMPANY

1241 Eastern Ave.
Kansas City, Mo.

941 Sixth Ave., S. E.
Minneapolis, Minn.

..... the new Butler Twin-Tank Safety Transport of ..... gallons capacity for truck, with ..... inch wheel base, ... inches back of cab and with compartments of ....., ..., ..., and..... gallons capacity.

Firm Name.....

Address.....

City..... State.....

ing complete modern and diversified equipment to meet the demands of the public and render service on the present day automobile, to the specifications and requirements of the manufacturer.

This study is based on dispensing three grades of gasoline, or three separate tanks and pumps in the absence of three grades, two tanks and pumps may be used for the predominating gasoline sales.

Equipment costs: Three 1000-gallon tanks, complete with driveway, water tight, lock type 3-inch fill caps, double poppet foot valves, line check valves, 2-inch vents, 1½-inch suction line, piping to be galvanized, wrought iron, based on tanks being 20 feet from pump island $400

3 Computor type meter pumps... 700

1 Complete hoist 400

1 7½-inch cu. ft. air compressor.. 200

1 Automatic air tower 90

1 All around high pressure grease gun 125

1 Complete set of miscellaneous grease or lubricating guns or equipment to take care of the various types of lubricants necessary for the various mechanical requirements and functions of parts to be lubricated, specialized lubrication.. 125

3 Metered lubricating dispensers to service E. P. lubricants and hypoid lubricants of several SAE specifications for transmissions and differentials.... 110

Equipment for servicing hydraulic brakes 15

Equipment for servicing shock absorbers 15

Battery handling tools, chargers and testing equipment 125

Tire tools and equipment for mounting and repairing tires. 125

Hydrometers and equipment for servicing, checking and dispensing anti-freeze 15

1 Mechanical unit or suction gun for cleaning transmission and differentials 35

1 Spring spray gun air operated.. 15

Various miscellaneous small tools; wrenches, stillson, open end, crescent, monkey, socket, etc., hammer, screwdrivers, pliers, tool steel, gauges, etc.. 75

5 30-gallon lubsters for bulk oil and kerosine storage 60

1 Vacuum cleaner for cleaning car upholstery 50

Station furniture:

1 Desk and chair 35

1 Station safe 75

1 Tire display and storage rack... 25

2 Accessory display cabinets, for complete and diversified accessory display, storage and protection 50

1 Metal clothes locker 20

1 Complete set bottles and stand for bulk oil display and dispensing purpose 10

1 Rack and stand for canned oil island service and display ... 10

1 Complete set of measures — 1 pint, 1 quart, 2 quarts, 1 gallon 5

1 Complete set of various funnels. 5

1 Regulation test can 5

Lavatory equipment: mirrors, towel containers, toilet tissue holders, soap dispensers, drinking facilities, paper cup holders, chair, waste baskets, signs, etc. 25

Fire extinguishers 25

Safety type refuse cans and waste baskets 5

Radiator service equipment — hose, nozzle and cans 5

Lubrication charts, file and records 10

Station maintenance and cleaning equipment and tools:

1 500 gallon waste oil tank 50

1 Outside storage box for coal and miscellaneous storage 35

Miscellaneous equipment:

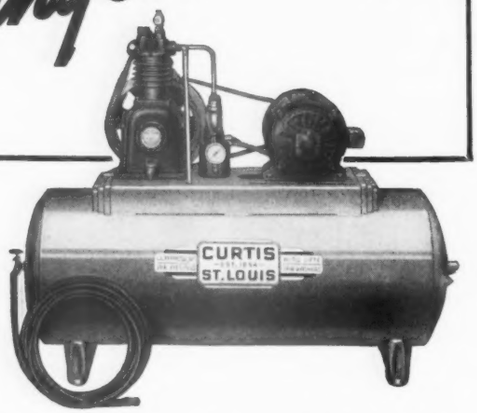
Garden hose, lawn mower, shovel, rake, shears, snow shovel, scraper, step ladder, small extension ladder, brooms, floor brush, window brush, etc. 50

Unallocated miscellaneous extras 50

Any other expense items not included in cost of building

CURTIS Compressors give you

Lasting Economy



Curtis Oil-Locked Lifts

Safely handle all cars. Complete accessibility. Self-leveling platform can't stick. Drop-away wheel guides center car.

Every dollar saved on maintainance is a dollar added to your net profits. That's one way Curtis Compressors will help you—by giving you dependable, low-cost air day in and day out, for *years* after many compressors would begin to fail.

These Curtis features reflect our eighty-four years of successful engineering experience and are your assurance of lasting economy:

- PRECISION MADE—greater efficiency, less wear.
- CENTRIFUGAL UNLOADER—no starting load.
- TIMKEN BEARINGS—less friction, adjustable.
- CENTRO-RING OILING—positive lubrication.
- V-BELT DRIVE—quiet, eliminates tightener.

Let us tell you what a compressor can do for you and how a CURTIS Compressor will result in Better Service and Greater Profits. Send for latest catalog on Compressors ☐ Lifts ☐.

CURTIS PNEUMATIC MACHINERY CO.

1965 Kienlen Avenue, St. Louis, Mo.

equipment: Engineering, plans, supervision, permits..... 500

Super Service Station, Anticipating 15,000 to 20,000 Gallons Volume Per Month

The study is based on the same type of building and construction as the smaller station, plus additional space. This building to be a so-called 3-bay service building in contrast to the smaller station, offering bay service to render lubrication, tire and battery service, car washing, motor tune-up and accessory installation service.

Size of building: 26 feet x 55 feet on foundation. Office or sales room, lavatories, storage room to be on same basis as outline of smaller station.

Heating plant, steam boiler, either coal or fuel oil fired. Entire driveway area to be hard surfaced, concrete or asphalt.

Equipment: Additional equipment necessary to facilitate additional volume and render additional services, over and above the study as prepared on the smaller type station.

1 Additional computor pump	$225
1 Additional 1000-gallon storage tank	100
1 Additional hoist	400
Difference in cost for larger air compressor	100
Car washing unit and allied equipment	150
Motor tuning devices and equipment	200
Additional inside ceiling or wall air scale	90
Additional merchandise display facilities	100
Additional miscellaneous unallocated tools	100
	$1465

Motor Clinic Training School Is Opened

BALTIMORE, May 28.—A national training school for motor clinic managers was opened here May 16 by the Ethyl Gasoline Corp. Its representatives from principal industrial centers will take part in an intensive course of instruction in the problems of the nationwide clinic program inaugurated this spring by the Ethyl corporation to develop closer working relationships between the oil and automotive industries.

A chief objective of the school will be the standardization of motor clinic procedures. The company's experience of the past several months in operating clinics over the country will be analyzed and the general clinic program reshaped to meet the needs of the diversified personnel of the oil, automotive and associated industries.

Since the company's traveling motor clinics were inaugurated many thousand individuals interested in some way in the servicing of automobile engines have attended the clinics to study the advances in automotive engineering and petroleum chemistry.

Jobber's Sales Meeting

KANKAKEE, Ill.—At a sales meeting of the Baron-Huot Oil Co. recently held here, attended by over 150 company employes and dealers, E. G. Telling was awarded the Diamond honor button and promoted to division manager with offices in Plano, Ill. The company recently completed a 65,000-gallon bulk plant at Plano.

At the meeting Arthur L. Huot was honored as being the oldest employe, having recently celebrated his 21st year with the company. It was announced that Morris Norberg had taken first place in the company's oil campaign.

E. Huot was toastmaster at the dinner. Talks were given by C. L. Dorris, manager of subsidiary companies, Mid-Continent Petroleum Corp., Tulsa, by W. J. Wixson, manager of the specialty department of the same company, and by M. F. O'Neil, general sales manager, Firestone Tire & Rubber Co.

WASHINGTON—The Board of Engineers for Rivers and Harbors announces a new issue of "Port and Terminal Charges at U. S. Ports," bringing up to Jan. 1, 1938, information on port dues and charges and on physical facilities at individual ports in this country.

One of many Insulated Steel Construction service stations erected for Shell Petroleum Corporation.

Build of

INSULATED STEEL CONSTRUCTION

with **PORCELAIN ENAMEL**

. . . and STOP the Cars at YOUR STATION

A few FACTS regarding these modern, economical buildings:

Lowest maintenance cost—no painting, no repairs, easiest to clean. Not subject to deterioration from age or weather.

Individualized as desired—built to your own architectural plan or to one of ours. Great variety of colors and designs available.

No structural framework—hollow steel panels, filled with insulating material, form walls that are perfectly rigid, warp- and buckle-proof, and directly support the roof. More clear space inside.

For further information, cost estimates, etc., write to

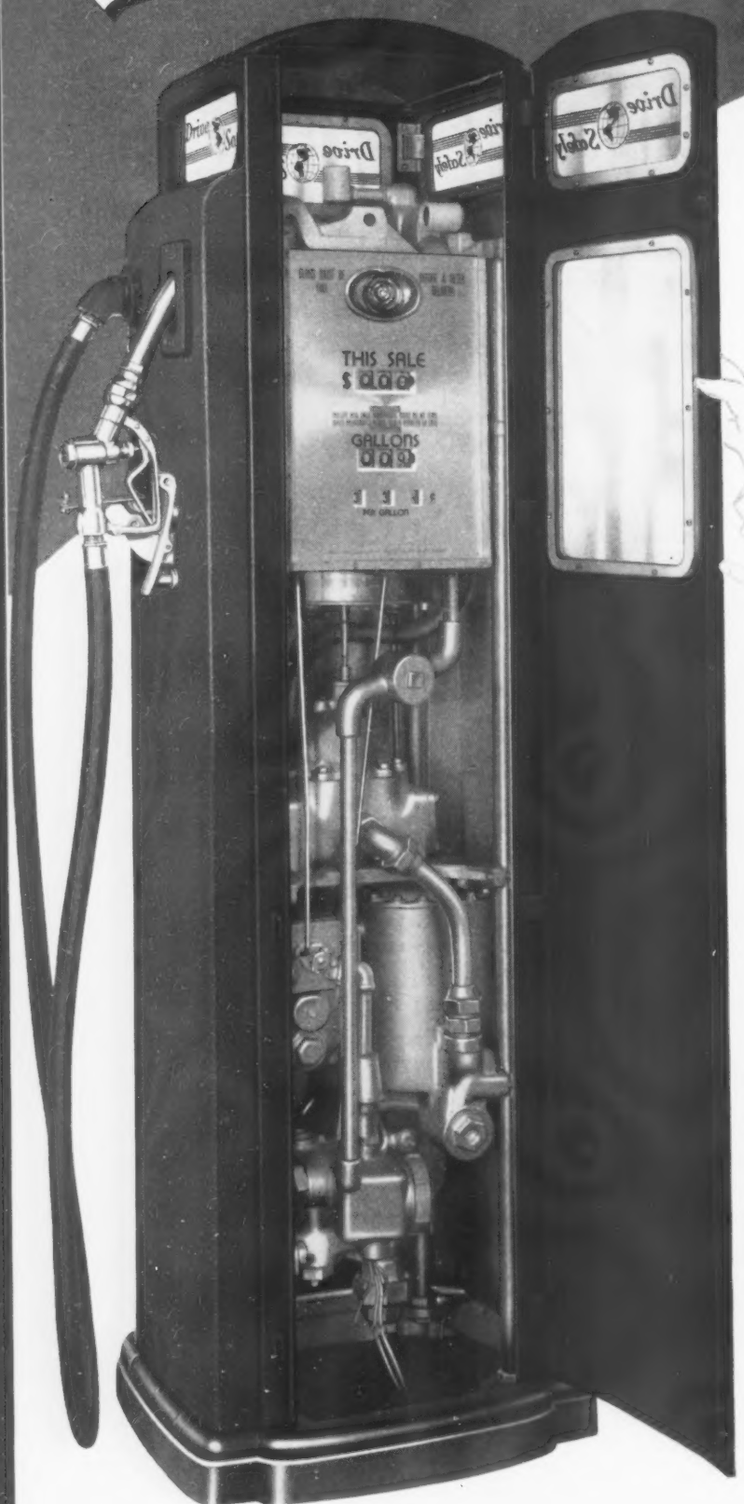
THE CINCINNATI MANUFACTURING COMPANY · Gest and Evans Streets, Cincinnati, Ohio

Sole manufacturers of "Insulated Steel Construction".

(below) Insulated Steel Construction station recently completed for Elk Refining Co., Charleston, W. Va.

Let's Look INSIDE The NEW

QUALITY BUILT
BENNETT
TRADE MARK REG., U.S. PAT. OFFICE



Just open one of the full length swing doors (front or rear) and examine the mechanism of the new BENNETT. You'll see genuine refinement in all major operating units; expert craftsmanship in every structural detail. The new BENNETT is truly an outstanding achievement . . . in efficient, accurate, dependable performance; sturdy construction; and easy accessibility of all parts.

1. BENNETT designed slow speed, high vacuum, rotary vane pump . . . with efficiency proved under all operating conditions. By-pass valve readily accessible. Extra large surface, fine-mesh strainer-screen.

2. BENNETT air eliminator . . . the most efficient unit ever developed for eliminating air, controlling vapor, and assuring safety. Non-chatter control valve. Integrally connected with pumping unit . . . no pipe connections.

3. BENNETT cup-leather or all-metal meter optional. Positive displacement type. Volumetric displacement of pistons easily adjusted. Accurate and dependable under all operating conditions.

4. Latest type computer. Clock is double-faced, with positive interlock. Suspended by strong brackets. Drive through self-aligning coupling. Dial is BENNETT design.

5. BENNETT "Radieye" seegage. Double seal glass easily removable for cleaning. Eliptical design serves as style keystone for entire housing.

6. BENNETT chassis . . . integral reinforced structural steel chassis . . . close coupled major units designed to reinforce steel frame. No flexible steel decks. Rigidity minimizes vibration and promotes long pump life.

7. Explosion proof 1/3 h.p. safety motor. Special BENNETT designed hooded "slip-joint" connection between motor and junction box. Built-in starting switch. Thermal protection if desired.

8. BENNETT lighting system. Straight line accessible conduit and junction boxes providing easy installation . . . sturdy trouble-free lighting switch . . . well illuminated advertising panels. Suffused non-glare lighting provided for dial face. Globe lighting if desired.

Write for BULLETIN G-8.

SERVICE STATION EQUIPMENT COMPANY

FACTORY AND EXECUTIVE OFFICES . . . MUSKEGON, MICH.

DIVISION OFFICES: ATLANTA — BOSTON — CHICAGO — DALLAS
DENVER — DETROIT — LOS ANGELES — LOUISVILLE — NEW YORK
PHILADELPHIA — PITTSBURGH — RICHMOND — SAN FRANCISCO
ST. LOUIS — ST. PAUL — FOREIGN DIVISION, 29 BROADWAY, NEW YORK

in Beauty that Attracts and Performance that Excels

Bennett Means Business

Practical Hints

For Efficient Operation Of Service Stations

GIVE THE LIFT A LIFT

The oil level in the lift should be checked regularly, about every month, and only when the lift is down on the ground. When the lift is equipped with an air tank, all air should be released before attempting to remove the oil gauge plug. On self-contained electrically operated auto lifts and air operated lifts not having an air tank, the oil can be checked through the top of the piston. In the electric lifts with remote power units, the oil level should be checked through the vent opening in the oil tank.

* * *

NOZZLES WITH RUNNY NOSES

If the hose nozzle develops a leak around the valve stem, an attempt should be made first to tighten the packing gland nut. If leak continues after nut is drawn up as far as possible, remove nut and fill the gland with packing. Care should be taken not to get the packing gland nut too tight as this will cause the valve to work hard, and may even cause it to stick open.

Nozzle leaks through the valve and out the discharge tube are usually the result of a worn valve disc. It may, however, be caused by dirt on the valve seat. Snapping the nozzle shut several times during discharge to a car may dislodge any foreign matter. If this does not stop the leak, unscrew the valve cap on top of the nozzle and remove the spring and valve disc, which should be replaced if worn.

* * *

DRIP, DRIP, DRIP

Should a leak occur in pipe joints, couplings, fittings, or connections to a valve, a partial take-up of the joint may eliminate the leak. Sometimes the litharge at the joints is cracked by vibration, and any further tightening of the connection will not stop the leak. In this case the joint should be disconnected, the threads cleaned, and reset in litharge-glycerine.

* * *

FANNING THE COMPRESSOR'S BROW

Look at your compressor flywheel. Is it running in the right direction? Although running in the wrong direction will not harm the motor or compressor, it will lower the efficiency of the inter-cooler, as the flywheel, when running in the correct direction, acts as a fan and aids in cooling the air compressor cylinder and inter-cooler. To determine if flywheel is running in the proper direction, note the direction arrow on the flywheel. If there is no arrow, see if the air from the fan is directed toward the compressor.

* * *

WATER IN LIFT RESERVOIR

Even though the proper amount of oil is used in the lift unit, if water is permitted to enter the reservoir it will cause an increase in volume, which will make the lift spout oil during the lowering operation. This condition is usually encountered in air-operated lifts, due to water entering the oil reservoir from the compressor tank and air lines.

To remove the water, insert a hand pump where the installation permits it and pump the water out of the bottom of the tank, or in the case of some power units and reservoirs, a plug is provided at the bottom of the tank through which the water may be drained out. This should be done after the solution has been standing for some time and the water permitted to separate from the oil.

However, in installations where a pump cannot be used and where there is no drain plug, denatured alcohol can be added in small quantities until the spouting stops. By adding about a gallon of alcohol at a time, an equal amount of alcohol is finally absorbed by the oil to the amount of water already absorbed, thus preventing further emulsification.

* * *

A SHINE ON THE LUBE ROOM FLOOR

The lubritorium floor should be kept clean at all times. Keeping it free from grease and oil not only improves its appearance but makes it safer for both attendants and customers.

One method of keeping the floor clean is to scrub it thoroughly each morning with very hot water and a good floor cleaning compound. A mop bucket should then be filled with a clean solution of water and cleaning compound, and a clean mop kept handy. After each service job the floor should be quickly mopped with this solution to remove any grease or oil spilled during the servicing.

* * *

WHAT'S THAT SIZZLING SOUND?

A sizzling sound near the head of a lift when the lift is raised is in all probability an air leak, and means that the fill plug gasket on top of the plunger needs replacing. An oil leak through the gland bolt holes or the outer rim of the lift's gland flange, indicates the casing gasket needs replacing.

Look for an oil leak right at the plunger when the full air pressure is turned on, or for an excessive quantity of oil on the plunger when the lift is raised. This indicates that the packing in the lift needs replacing, provided the gland bolts are pulled up tight.

* * *

CHECKING COMPRESSOR TANK CAPACITY

Does your air compressor have the correct tank capacity?

Nearly all compressor manufacturers rate their tank capacities in gallons. Where a tank is rated in cubic feet, multiply by 7½ to get the capacity in gallons. For each gallon of capacity multiply by the constants given below according to the horsepower of the unit, which will give you approximately the time in minutes required to build the pressure from 100 pounds to 130 pounds, or from 120 pounds to 150 pounds.

Horsepower	½	¾	1	1½	2
Multiplier	.2	.1	.075	.06	.05

Example—If the outfit has a 16 x 40-inch, 35-gallon capacity tank and is operated by a 1½-horsepower motor, in order to determine how long it would take to pump from 120 to 150 pounds pressure you would multiply 35 by .06, which would give you 2.1 minutes.

* * *

PUMP FAILURES

If a pump fails to operate, the trouble is sometimes caused by the foot valve or check valve sticking in the closed position. The valve can often be dislodged by tapping the suction pipe line lightly.

* * *

DO YOUR PUMPS LIE TO YOU?

When you open your station each morning pump three five-gallon deliveries into your test bucket. Test in various ways—by pumping a one and four-gallon delivery, a two and two and one-gallon delivery, and a two and three-gallon delivery into the five-gallon test bucket. This will give you a good idea of whether or not your pumps are giving accurate delivery.

* * *

FOOT VALVE TROUBLE

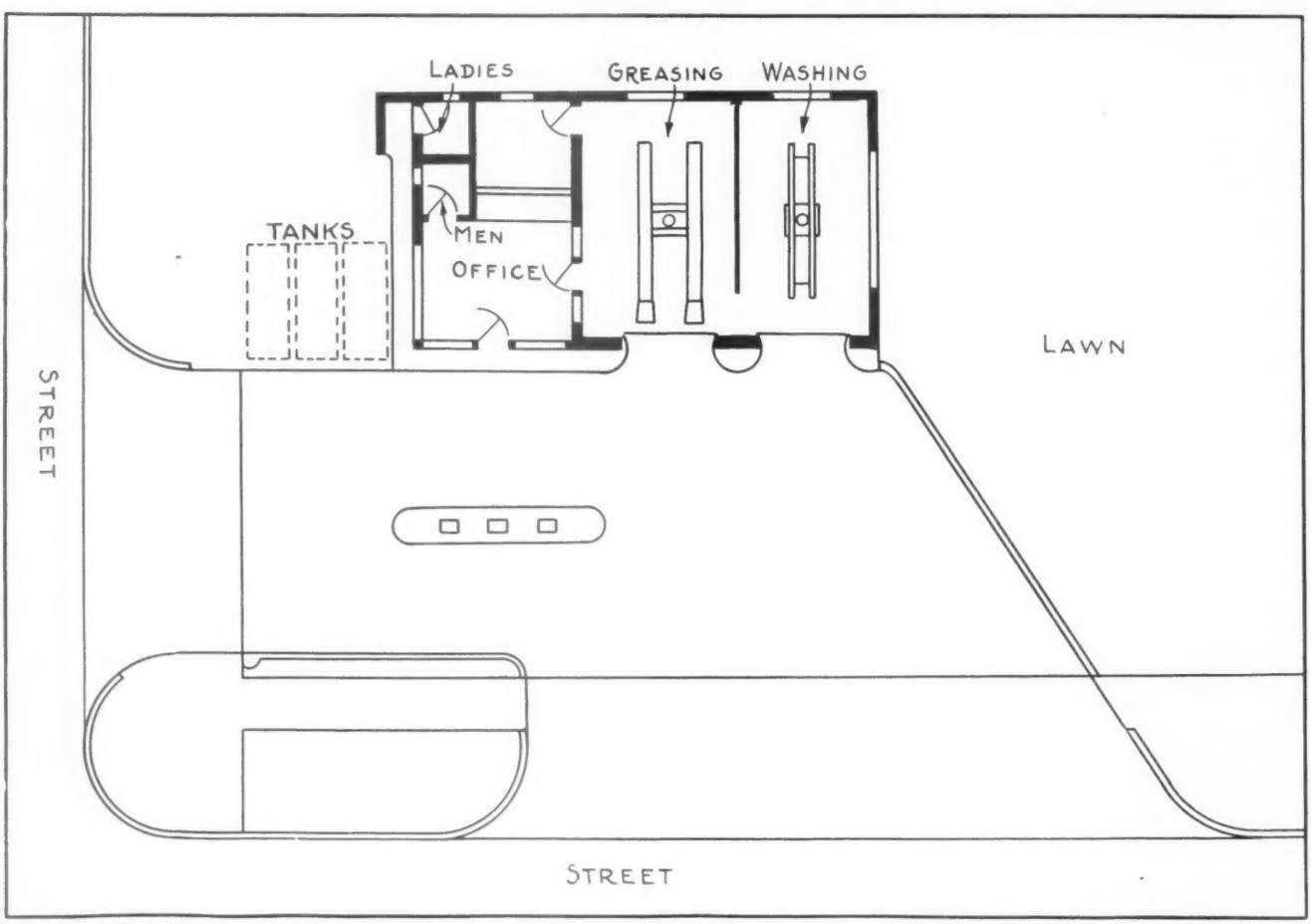
Foreign matter sometimes gets into the underground storage tank and scratches the disc or the seat of a metal-to-metal disc foot valve, thus causing the valves to allow gasoline to seep back into the tank, which shows up on the visigauge. It often happens, however, that the trouble is not with the foot valve, but in reality is some other part of the dispensing line, the pump, or leaky joints.

When installing brass foot valves, manufacturers urgently recommend the use of the heavy hex on the top of the valve, instead of the damaging method of putting a pipe wrench on the body. The latter method is apt to distort or spring the valve mechanism.

The Canopy Goes Modern

This station, one of the latest designs with a canopy, is an outlet of the Skelly Oil Co. Located in Tulsa, the building is constructed of hollow clay tile and brick. The exterior is stuccoed, and the interior of the office and sales room is plastered.

The interior of the service rooms is of smooth clay tile and painted. The canopy is of steel frame construction and trimmed with stainless steel. Wide curb cuts add to the inviting appearance of the station.



Minimum Profits Standards For Service Stations

TO THE MARKETER and station operator who wants to know if his stations really "measure up", NATIONAL PETROLEUM NEWS offers a yardstick on its Minimum Profit Standards, which are based on oil company records of efficient station operation and are designed to show the minimum standard of efficient station operation that will bring a profit. These standards are republished on a following page.

In other words, these Minimum Profits Standards are the red light—the signal to stop and study and analyze individual station operations.

The average type of neighborhood stations that do lubricating jobs and sell tires and other accessories, should have a total operating cost when all the expense is averaged against the gasoline gallonage ALONE, of not more than 4.75 cents per gallon, according to N.P.N.'s Minimum Profits Standards. Likewise, with the large station, the total cost so averaged should not be less than 6 cents per gallon of gasoline sold. These figures are the average gross profit these types of stations can expect from all sales.

The Minimum Profits Standards for service station cleanliness and sanitation, which are also republished here, were drawn up by NATIONAL PETROLEUM NEWS editorial department to show the degree of appearance and sanitation of the station which must be met to hold the trade TODAY of a public constantly growing more fastidious as to the rest room and toilet facilities it uses.

Both the Minimum Profits Standards and the standards for station sanitation are part of NATIONAL PETROLEUM NEWS' spring rehabilitation campaign for marketers and were published originally several weeks ago.

MINIMUM PROFIT STANDARD

For Large Station, 15,000-20,000 Gals. Monthly

	Monthly Operating Expenses	Operating Cost Per Gallon— 12,000 Gals. Mo.	15,000 Gals. Mo.	20,000 Gals. Mo.
Light, heat, water, phone	$65	.54 cts	.43 cts.	.325 cts.
Rent on land	66	.55	.44	.33
Interest on investment	73	.61	.49	.365
Wages	450	3.75	3.00	2.25
Insurance	10	.08	.07	.05
Repairs and maintenance	25	.21	.17	.125
Obsolescence and depreciation	85	.71	.56	.425
Shortage and losses	10	.08	.07	.05
Taxes	25	.21	.17	.125
Total	$809	6.7 cts.	5.4 cts.	4 cts.

MINIMUM PROFIT STANDARD

For Neighborhood Station, 5,000-10,000 Gals. Monthly

	Monthly Operating Expenses	Operating Cost Per Gallon— 5000 Gals. Mo.	7500 Gals. Mo.	10,000 Gals. Mo.
Light, heat, phone and water	$35	.7 cts.	.47 cts.	.35 cts.
Rent on land	50	1.0	.67	.5
Interest on investment	33	.66	.44	.33
Wages	200	4.0	2.66	2.0
Insurance	5	.1	.07	.05
Repairs and maintenance	12	.24	.16	.12
Obsolescence and depreciation	46	.92	.61	.46
Shortage and losses	5	.1	.07	.05
Taxes	15	.3	.20	.15
Total	$401	8 cts.	5.3 cts.	4 cts.

Investment and Equipment in Service Stations On Which Minimum Profits Standards are Based

Below is listed the investment in buildings, driveways and equipment for the two types of stations on which National Petroleum News Minimum Profits Standards for stations are based.

Investment and Equipment in Service Station on Gallonage Range of 5000-10,000 Per Month

Location—Corner lot approximately 75 by 60 feet, driveway entrances from both streets, land having market value of $7500, rental at rate of 8 per cent, and no land taxes paid by oil company.

Building — Put up by local builder of lowest cost materials, locally available, one-stall lubrication department, no canopy, one pump island, two toilets, heated by stove $4000.00
Drive, stone 800.00
Equipment total 1900.00

Total $6700.00

EQUIPMENT AND INSTALLATION

No.	COSTS
1 Computer pump	$225.00
2 Meter pumps	280.00
1 1000-gallon underground tank	55.00
2 550-gallon underground tanks	60.00
1 Air compressor, one horsepower	175.00
1 Hydraulic drive on lift	400.00
1 Air stand	38.00
2 Flood lights	70.00
4 Lube Hi Boys	100.00
1 Kerosine outfit	30.00
2 Gear oil kits	24.00
Grease guns	75.00
Furniture	15.00
Miscellaneous tools—Measures, funnels, etc.	100.00
Installation and hooking up tanks	125.00
Electrical work	125.00
Total	$1897.00

Investment and Equipment in Service Station With Gallonage Range of 15,000-20,000 Per Month

Location—Corner lot approximately 90 by 60 feet, driveway entrances from both streets, land given market value of $9900, rent on basis of 8 per cent and no land taxes paid by oil company.

Building—Put up by local builder of lowest cost durable material frame stone brick, size 24 by 48, three lubrication stalls, no canopy, two pump islands, two toilets, heated with hot water circulating system..... $7,500.00
Drive, stone 1,500.00
Equipment 3,200.00

Total investment $12,200.00

EQUIPMENT AND INSTALLATION COSTS

2 Computer gasoline pumps..	$450.00
3 Meter pumps	420.00
2 1000-gallon underground tanks	110.00
2 550-gallon underground tanks	60.00
1 Air compressor, 1½ horsepower	200.00
2 Hydraulic drive on lifts....	800.00
2 Air stands	75.00
3 Flood lights	100.00
6 Lube Hi Boys	150.00
1 Kerosine dispensing outfit..	30.00
4 Gear oil kits.....	48.00
Grease guns	100.00
Furniture	100.00
Miscellaneous tools — measures, funnels	100.00
Installing pumps and tanks, and hooking up.....	250.00
Electrical work	200.00
Total	$3193.00

N.P.N.'s Minimum Profits Standards For Appearance and Cleanliness Of Nation's Service Stations

The following Minimum Profit Standards, for appearance and cleanliness of service stations the country over, are offered by NATIONAL PETROLEUM NEWS. They have been published in earlier issues in connection with articles and statements from various authorities to bring to the attention of the oil industry the fact that the public is becoming aroused against unclean toilets at stations as possibly unsafe toilets. As a result of this growing public education in toilet and rest room sanitation, an increasing proportion of gasoline gallonage this season will go to the stations which, by their outward appearance, show that their rest rooms and toilets are clean.

For Station Site . . .

No empty cans, rags, or rubbish on drive.

Curb and drive edges clean and whitewashed.

No wet or dried grease or oil spots on drive.

Floodlight reflectors clean, lights in good condition.

Pump island clean and whitewashed frequently.

No discarded cans, pails, or rags on pump island.

Pumps washed frequently.

Pump hose free from leaks and not frayed.

Pump globes and lights in good condition and clean.

Fence, wall, hedge, or garden in well kept condition.

Air hose picked up and in good working order.

Curb and street signs freshly painted and well lighted.

Fill box openings painted and free of dirt.

For Station Building (Exterior) . . .

All unsightly and poorly painted signs eliminated.

Building surface free from splatters.

No chipped or broken exterior wall surfaces.

Roof in good condition.

All empty or unkept cans, barrels or boxes out of sight.

Windows clean.

For Station Building (Interior) . . .

Walls, floors and ceiling clean, with no grease spots.

Office equipment well kept, with no loosely filed papers in evidence.

Manager's desk clean, with no milk bottles, coffee cups, newspapers, rags, lunches, or tools in evidence.

Conservative use of signs, cards and wall charts.

Attendants' street clothing and miscellaneous stock kept out of sight in closet or storage room.

Pit or lift well cleaned after each job.

Lubritorium floor cleaned after each job.

Lubritorium walls, ceiling and floor well painted.

Stock of tires, batteries, and accessories neatly arranged and **Clean.**

Work bench cleaned off after each job and tools put in proper place.

Grease guns in proper place on clean rack when not in use.

High-boys with no oil spillage on top, front or sides.

Container for oily rags and rubbish freshly painted and with a lid or self-closing top.

Waste basket in office.

Comfortable and **Clean** chairs for customers.

Window displays that are timely and not piles of a mixture of winter and summer items.

All miscellaneous items, not necessary to the immediate job of serving customers, out of sight, including such items as brooms, mops, step ladders. and overalls.

Lamp bulbs in good condition and light fixtures clean.

Lubritorium and other service bay entrances unobstructed.

No odds and ends lying around, such as old second-hand tires, scrap parts, junk, or old batteries

Compressor clean, and located where noise will not interfere with conversation with customers.

For Station Toilets and Wash Rooms . . .

All toilets in **Good Repair.**

Wash bowl fixtures in **Good Repair.**

Toilet and wash bowls **Spotlessly clean.**

Toilet seat freshly painted and clean.

Floors, walls and ceiling clean.

No litter in the rooms.

Do not use rest rooms to store **Anything.**

Rooms and fixtures inspected, **Frequently Each Day.**

Clean rest rooms at least **Once a Day.**

Supply soap and towels (paper towels at least).

Rooms should always **Smell Clean.**

For Personnel . . .

Uniforms and caps **Clean.**

Attendants clean-shaven.

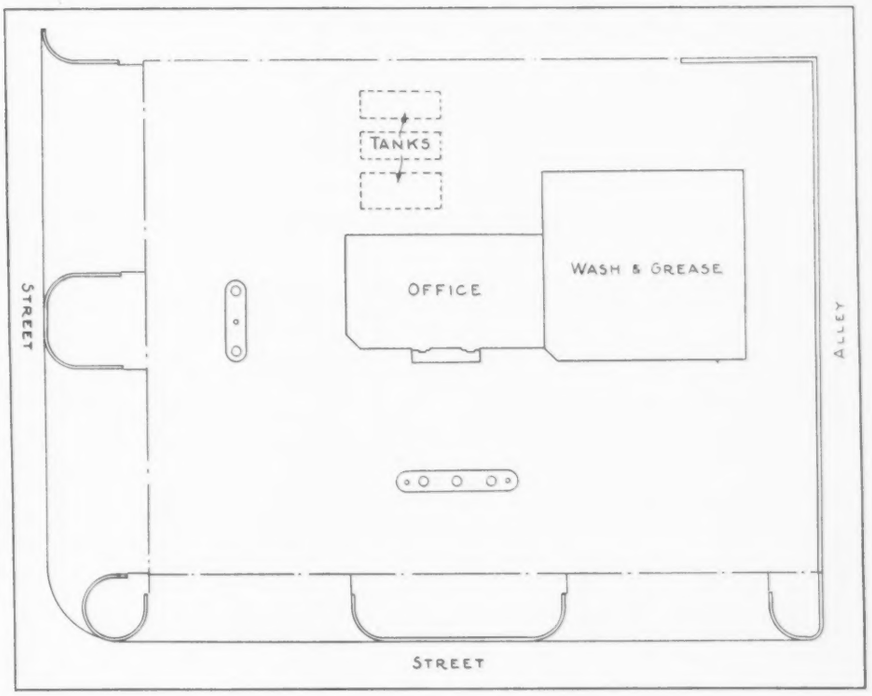
No dirty rags in attendants' pockets

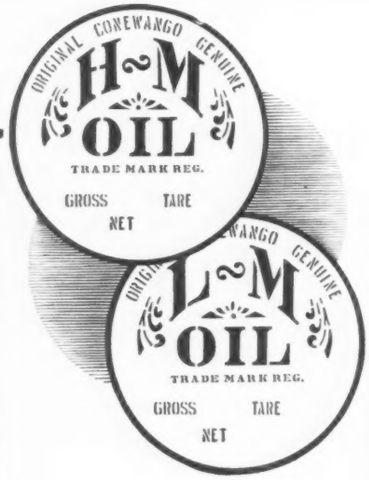
Glazed Brick Exterior

Located at Kansas City, this station is one of the latest designs of the Phillips Petroleum Co. The building combines an office 17 feet x 28 feet, and a two-stall wash and grease room 30 feet wide x 28 feet deep, built of green glazed brick on the exterior and buff glazed brick on the interior.

Floors are of concrete, windows have steel architectural projected sashes, and the roof is a standard 15-year guarantee type.

The floor plan includes an enclosed closet to handle tire and grease storage and the air compressor. Battery charging equipment is installed at the rear of the station close to the greasing rooms. Shelving is placed around the entire building both above and below the windows to provide storage for canned oil, greases and supplies.





The Accepted Standards of Pennsylvania Bright Stock Excellence Since 1900

H-M and L-M Oils Are Made Solely By

THE CONEWANGO REFINING CO.

Warren, Pa.

Home Town Merchant Copy Theme Of Wisconsin Dixie Jobbers

MILWAUKEE, May 27. — Dixie jobbers in Wisconsin are conducting a joint advertising program on the "home town" theme of the jobber and dealer being a local merchant.

Insertions of the institutional copy were placed in the Milwaukee Journal, which covers the Dixie jobber territory, in March, April and May and the final advertisement will be run in June. Then the campaign will be continued on billboards in the state during July, August and September.

The newspaper advertisements show pictures of a home, bank, school, store, and the city hall with cutlines such as "I live here," "I bank here," "I spend my money here," and so on.

The copy tells how the Dixie jobber and dealer are local merchants. "I live here, spend my money here, support my city and fellow-citizens who are in business here," one advertisement read.

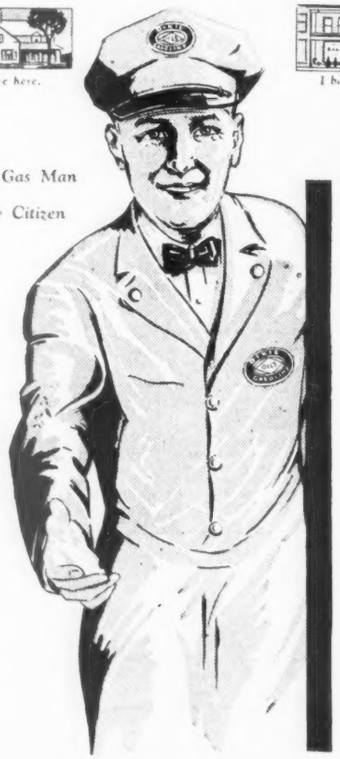
"I own my gas station . . . it is my business. I am an individual . . . just like you . . . and in business to be of personal service to you.

"The money you spend with me for gasoline and oil I spend for the things you make, the things you sell, the things you depend upon for a living.

"When you buy gasoline and oil from me, we simply exchange dimes and dollars . . . you get what I have to sell, I buy what you have to sell. Our money stays in town . . . and goes all around the town, for the better benefit of everyone living in this town."

The advertisements are signed by the 20 Dixie Distributors of Wisconsin. Newspaper copy is four columns by nine inches. The campaign is being financed by the advertising fund set up in the Dixie jobbers buying arrangement.

The Dixie Gas Man Your Fellow Citizen



A Local Boy •Making Good

I am the Dixie Gas Man . . . in business for myself, paying my own way . . . and doing business in my own way . . . to serve, satisfy and please you. And every dollar profit I make stays right here in our town . . . spent for things my family and I need . . . things you make and sell and rely on for a living.

Buy your gasoline and oil the local way . . . from me, the Dixie Gas Man, your fellow citizen. When driving by, drive in . . . *let's be seeing each other.*

The reason why I sell Dixie gas and oil is the reason why you ought to use only Dixie in your car . . . highest quality in purity value, lowest price in motor mileage cost. When driving by, drive in . . . I'll tell you personally in detail why Dixie gas and oil are best for your car, and easiest on your purse. I am the Dixie Gas Man, your fellow citizen . . . when driving by, drive in . . . *let's be seeing each other.*

• The Power to Pass . . That's Dixie Gas •

WISCONSIN DIXIE DISTRIBUTORS

Kaumeier Sales and Service Co.	GILLET
Independent Oil Co.	MORICON
Waupun Oil Co.	WAUPUN
Eckert & Wollum Oil Co. (66) W. North Ave.	MILWAUKEE
Stanek Oil Co.	MANITOWOC
Tigerton Oil Co.	TIGERTON
Milwaukee Badger Oil Co. 218 E. Buffalo	MILWAUKEE
Bay Oil Co.	WILLIAMS BAY
Wisconsin Oil Corporation	RAYMORTH
Prendergast Oil Co.	LAKE GENEVA
Lomira Oil Co.	LOMIRA
Clintonville Oil Co.	CLINTONVILLE
Stratford Oil Co.	STRATFORD
Randolph Oil Co.	RANDOLPH
Milan Oil Co.	ATHENS
Alfred Ehlers Oil Co.	BROOKLAN
Trempealeau Oil Co.	TREMPEALEAU
McDonald Oil Co.	GREEN BAY
Fox River Valley Oil Co.	MENASHA
Wisconsin Rapids Oil Co.	WISCONSIN RAPIDS
Granton Oil Co.	GRANTON

DIXIE OILS GASOLINE

More Gasoline for Your Money . . . Because More Miles for Your Motor

Marketing in the Middle West

By **E. L. BARRINGER**
N. P. N. Staff Writer

Can a neighborhood type service station put on a drive for additional business?

Usually neighborhood stations are content to sit back and take care of the business that comes across the drive. Management relies on "service" to keep customers coming into the station, feeling that when a regular customer needs a tire, battery, lubrication job or an oil drain he will ask for it.

A break with this traditional attitude towards asking for business was made recently by the Bowes Service Station, a neighborhood station in Evanston, Ill.

The station has no banners flying in the breeze, nor are there any special price inducements and, from outward appearances the casual customer would not know the station salesmen are concentrating on tire sales. But they are. The salesman selling the most tires in April will receive $5 in cash. The same offer holds for May, also for June.

Effect of the $5 offer is evidenced by the sales activity of one salesman. He called on his father-in-law who operates a garage, sells no accessories. By noting the condition of tires on cars parked in the garage the salesman got some tips. Calls on these prospects brought promises of four tire sales, and all this for several hours work.

"Did you sell any tires before?"

"Oh yes," the salesman replied, "about ten a month to customers on the drives." But this was his first outside solicitation and all because a $5 bill was dangled before him as a reward.

Some marketers feel that a salesman on salary should not need an incentive to sell. In fact, they reason, the keeping of the job should be sufficient incentive to sell whether on or off duty. However, since a bonus does act as a stimulant on most men, maybe the retailer not entirely satisfied with his station's income might gamble a $5 bill and see what happens to sales.

* * *

With the coming of summer some neighborhood station operators again have a brisk increase in the bicycle free air trade.

This kind of business can be annoying. A gang of boys can crowd around the air standard and keep away the paying gasoline customer who wants his tires checked. Inflating a bicycle tire, as boys do it, can consume a lot of air as well as time.

Since boys will come to the service station for free air, some retailers have tried to turn a profit on this trade by selling bicycle tires. One Milwaukee retailer stocked bicycle tires late last season, sold 15, and expects to have a brisk trade this summer.

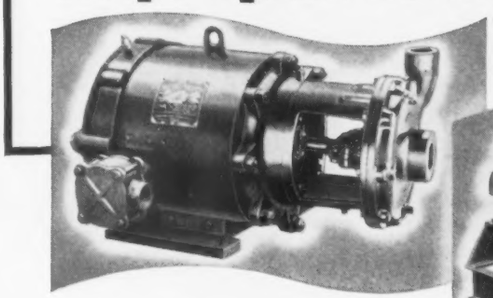
If there are enough bicycles in a neighborhood to clutter the air standard it may pay the retailer to investigate selling tires.

* * *

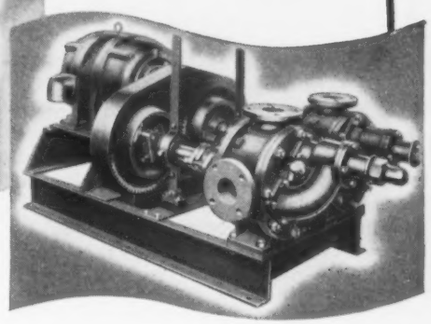
Since major oil companies and many jobbers have leased their company owned service stations it has been a practice of the supplier to carry approved credit accounts.

To enlist the aid of dealers in keeping accounts paid up the Pate Oil Co. of Milwaukee, sends each dealer once a month a statement of the condition of approved accounts at that station. The dealer can ask for a payment on account, thus keeping down the amount and preventing the loss of a customer should the account be cut off.

The Right Pump for the Job Is Very Important in PETROLEUM SERVICE



F-M built-together motor pump units with explosion-proof motors



F-M twin unit rotary pumps for bulk stations, refineries, and blending plants

NATURALLY you choose a pump built for handling petroleum products rather than a water pump that can perhaps be adapted. But that isn't all there is to it.

Pumping oil is one job. Pumping gasoline is another. And the right pump for the job is very important. That is why Fairbanks-Morse builds a complete line of pumps in many sizes and types for handling petroleum products.

This also means that the Fairbanks-Morse sales engineer's recommendation is not influenced by the size or type he happens to have. His judgment is influenced by just *one factor:* the size and type of pump that your pumping job needs.

World-wide service records of F-M petroleum and petroleum products pumps provide interesting proof of performance that is worth examining before you make a final decision. Write Department 69, Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago, Ill. 35 branches throughout the United States —a service station at each.

When it's even too hot for a Hottentot, *COMFORTIZE* with Fairbanks-Morse air conditioners.

7365-PA02.13

FAIRBANKS MORSE

DIESEL ENGINES
PUMPS
ELECTRICAL MACHINERY
FAIRBANKS SCALES
RAILROAD EQUIPMENT
WATER SYSTEMS
REFRIGERATORS
RADIOS
WASHERS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS

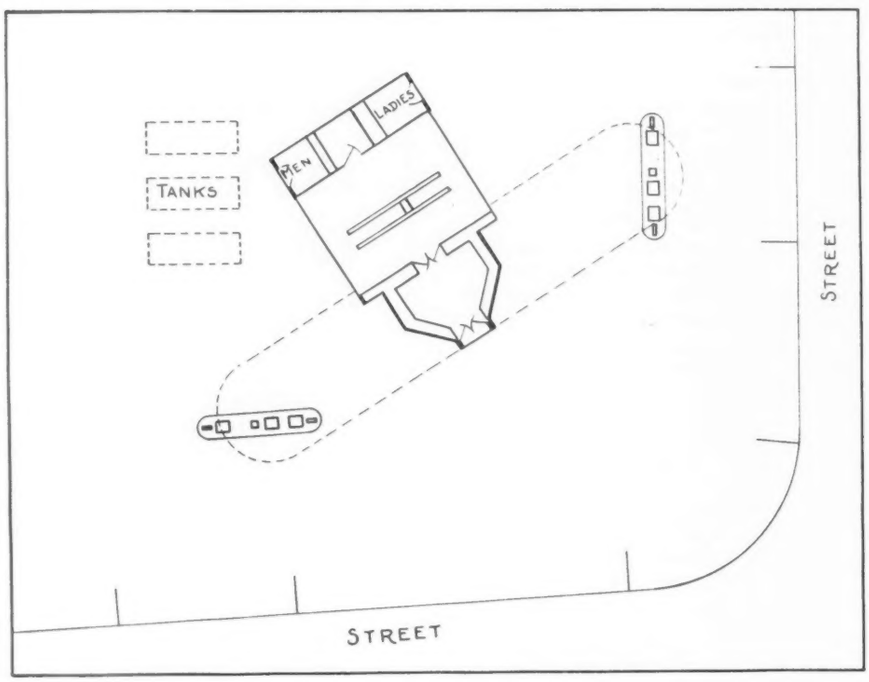
Pumps

Standardized Design

This building, operated by the Tide Water Associated Oil Co. at Los Angeles, is designed so that either a lengthened or shortened canopy can be used to accommodate individual site conditions. The company claims this type of building is less costly than the regular "L" type wherein the canopies extend out over the blocks at right angles to the streets.

Sizes, dimensions, arrangements of lubritoriums, and Associated station buildings are becoming more standardized. The uniform building design lends itself to color scheme, advertising signs, and ease and simplification of operation.

Associated's buildings are constructed of light weight angle frame steel, covered with sheet metal and painted to conform to the company's red, cream and green color scheme. Interior partitions in some instances are wood or metal lath and plaster. These buildings are largely shop-fabricated in units of suitable size, thus reducing field labor required for erection.



New Equipment

AND THE MANUFACTURERS

PUMP PANEL—A new innovation in the Bennett pump, manufactured by the Service Station Equipment Co., Muskegon, Mich., is the "Drive Safely" slogan which is placed on glass and fitted into the top panels of the pumps

as they are shipped from the plant. According to the company, many oil companies are making special requests for these panels in their pump orders, using the slogan on two sides of the pump, and their brand name on the other two sides.

* * *

GOLDEN ANNIVERSARY — The Electric Storage Battery Co., largest manufacturer of storage batteries in the world for every purpose, in June will begin to observe its golden anniversary year. Its plants now devote over 30 acres to the manufacture of batteries and the company has branches in 19 cities.

* * *

SALES MANAGER — William S. Richardson, merchandising manager of the B. F. Goodrich Co. mechanical goods division, has been made general sales manager of the same division succeeding C. E. Cook, who died April 16.

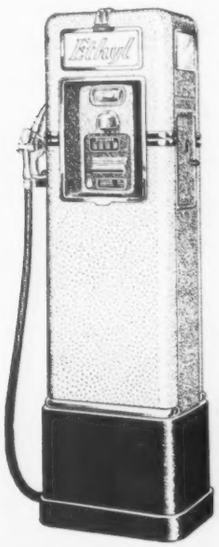
* * *

NEW CATALOG—The Amco Corp., 1213 W. Washington Blvd., Chicago, announces publication of a new complete catalog.

Phillips Pump & Tank Co., Cincinnati, announce the affiliation of Stanley H. Frensdorf with the company. The company has augmented its line of service station products and is starting a sales expansion campaign.

* * *

PRINTING PUMP — A complete gasoline dispenser combined with its Xacto recording printer dial is offered by S. F. Bowser & Co., Inc., Fort Wayne, as its Figure 510-K. The pump prints zeros at the start of each sale and then the exact amount delivered. During the delivery operation the slip is locked inside. When delivery is completed, the exact quantity dispensed is printed on the slip when the door covering to the ticket slot is raised. The pump is made in



two capacity ranges and is especially designed for installation in service stations which cater to truck, bus, taxicab and commercial fleet business. Continuing the same streamline appearance, the new Bowser Figure 565-A computing pump includes numerous refinements. The dials are larger; the advertising panels have been placed above the dials and on each side, thus making four instead of the usual two. The sight glass and flow indicator are illuminated. The pump is equipped with the Bowser Zero-Start Interlock, which makes it necessary that all figures be returned to zero before the motor can be started.

Chas. N. Lockwood, formerly sales manager of Nu-Way, has become western manager of the Fluid Heat Division of Anchor Post Fence Co., and will have headquarters in Chicago. He was president of the Oil Burner Institute in 1937.

* * *

Announcement of a new division of The B. F. Goodrich Co., Akron, Ohio, to handle the sale of rubber-like materials and synthetics has been made. Dr. H. E. Fritz will head the division.

* * *

"Clean Diesel Oil — by Sharples" is the title of a new sales bulletin now available from The Sharples Specialty Co., 23rd and Westmoreland Sts., Philadelphia, manufacturers of centrifuges.

* * *

BURNER ANNOUNCED — R. W. Beckett, long prominent in the oil heating industry, has announced his own pressure atomizing oil burner to be known as the Beckett Commodore, with capacities ranging from .8 to 3.5 g.p.h. Its specifications include one-tenth horsepower motor, two-stage fuel unit, standard controls and transformer. It will be manufactured by the R. W. Beckett Engineering Co., Elyria, O.

* * *

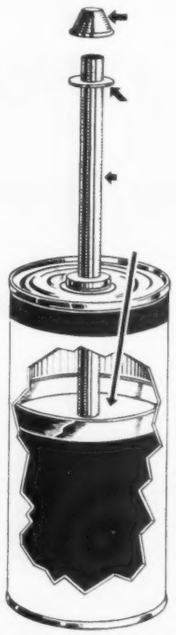
FORD INTRODUCES C. O. E. TRUCK — A new cab-over-engine truck, available in 101 and 134-inch wheelbases, has just been announced by the Ford Motor Co. Both chassis are powered by the Ford V-8 engine and are available in driveaway type for mounting special bodies. A stake body is also offered on each wheelbase length.

Due to the fact that the load center is farther forward, also that the cab is more directly over the axle, a front end assembly of greater strength is used, according to the announcement. This consists of a larger axle and two longitudinal springs 37½ inches long. Carburetor, spark plugs, and the top of the engine are easily reached by removing the sides of the engine cover.

New Ford V-8 cab-over-engine truck

FRONT PAGE NEWS

- Refiners, Jobbers and Wholesale Distributors are asked to inquire promptly about the master container GunKan three pound capacity.
- GunKan loaded with lubricant. Ready for use.
- No can opener, air pressure or extra gun required to transfer gear lubricant into case.
- Be first to cash in on this Quick Profitable Service.
- Exclusive Territory to be allotted.



GunKan
Patent Pending
Tube inside of can when not in use

American Oil and Grease Corporation
CHICAGO, ILL. 203 N. Wells St. Phone Randolph 9371
"Lubrication Since 1904"

Oil Scouts Year Book For 1938 Issued

For the past 10 years the National Oil Scouts Association of America has issued a year book, reviewing developments of the preceding year. Each volume has been an improvement over the previous one in amount of data included and the 1938 book, just off the press, is again outstanding. In type of information it carries, the book is not duplicated elsewhere in petroleum literature.

Development reviews on 18 states are included. Several of the states, such as Mississippi, have no oil production yet but are important from the prospector's standpoint. The two most active states east of the Mississippi River, Michigan and Illinois, are treated in the same comprehensive manner as are all the producing states west of that river. On nearly every important field the year of discovery is given, cumulative recovery, producing acreage and production in 1937, along with other pertinent date.

The book contains numerous maps and included are four articles on field technology. It was edited by M. R. Alexander and Lee A Adams. It is supplied free of charge to active and associate members of the association upon payment of the annual dues of $5.

Hays Double Seals and Copper Pipe...

It costs important money to build a modern service station—everything you do to protect that investment to keep pumps in service is good planning. Hays Copper Plumbing from tank to pump eliminates swing joints uses smooth copper bends to reduce friction in the line. Only 2 or 3 Hays Double Seal connections are required per pump line.

Double Seals are copper to copper—no letharge or sealing agent required. Only Double Seals feature 2 plane contact 40° plus 90°. Only Double Seals tie in with iron pipe threading. Use Double Seals and copper pipe to eliminate underground leaks forever. Write for 24 page catalog.

HAYS MFG. COMPANY, ERIE, PA.

Atlantic Refining Co. Honors Truck Drivers

PHILADELPHIA—A dinner honoring some 300 truck drivers of Atlantic Refining Co. who have driven an aggregate of 4,000,000 miles without an accident, was given by the company at the Hotel Philadelphia, here May 19. Drivers represented both the company's delivery division and those engaged in refinery trucking.

Gold pins and safe-driver certificates were presented to the men of the delivery division who have driven three years without accident by Wayne C. Yeager, vice-president and general manager of domestic sales, and F. M. Neall, manager of Philadelphia and suburban sales. Men in this division with one and two year free accident records received pins and certificates from J. Willard Lord, safety engineer, and J. Howard Meyers, safety director.

Howard M. Nichols, Point Breese refinery manager, presented awards to the refinery truck drivers.

Chicago Golf Party

CHICAGO, May 31.—The annual golf party and dinner of the Chicago Oil Men's Club will be held at Butterfield Country Club June 9. There will be prizes, and the party is free to resident and associate members. Non-resident members and guests will be charged $4.50.

New Patents

Compiled by R. E. Burnham, patent and trade-mark attorney, 511 Eleventh Street, N. W., Washington, D. C., from whom copies may be obtained at the rate of 25c each. State number of patent and name of inventor when ordering.

March 8, 1938

REFINING

Process of removing corrosive sulphur compounds from petroleum oil—Francis M. Archibald, Elizabeth, N. J., assignor to Standard Oil Development Co. Filed May 2, 1935. No. 2,110,283.

Extraction process—Monroe E. Spaght, Martinez, Calif., assignor to Shell Development Co. Filed Apr. 24, 1935. No. 2,110,311.

Conversion of hydrocarbon oils—Charles H. Angell, Chicago, Ill., assignor to Universal Oil Products Co. Filed Dec. 11, 1935. No. 2,110,495.

Solvent dewaxing and extracting of petroleum oils—Eric B. Hjerpe Pittsburgh, and William A. Gruse, Wilkinsburg, Pa., assignors to Gulf Research & Development Co. Filed Nov. 2, 1934. No. 2,110,627.

Process for breaking petroleum emulsions—Charles M. Blair, Webster Groves, Mo., assignor to Tret-O-Lite Co. Filed June 21, 1937. No. 2,110,837.

Processes for breaking petroleum emulsions—Melvin DeGroote, St. Louis, Mo., assignor to Tret-O-Lite Co. Filed June 21, 1937. Nos. 2,110,846, 2,110,847, 2,110,848, and 2,110,849.

MISCELLANEOUS

Method of making sulphuric acid from waste materials—Paul J. Harrington, Westfield, and Harry G. Burks, Jr., Elizabeth, N. J., assignors to Standard Oil Development Co. Filed Oct. 7, 1933. No. 2,110,267.

Light stabilizer for hydrocarbons—Louis A. Mikeska, Elizabeth, and John B. Holtzclaw, Roselle, N. J., assignors to Standard Oil Development Co. Filed May 25, 1935. No. 2,110,274.

Pure compounds as extreme pressure lubricants—Elmer W. Adams and George M. McNulty, Hammond, Ind., assignors to Standard Oil Co. (Ind.) Filed Mar. 31, 1934. No. 2,110,281.

Oil testing machine—Mead Cornell, Philadelphia, Pa., assignor to Faville-Le Valley Co., Chicago, Ill. Filed Apr. 22, 1935. No. 2,110,288.

Separating H_2S mercaptans from hydrocarbons—Ludwig Rosenstein, San Francisco, Calif., assignor to Shell Development Co. Filed June 10, 1935. No. 2,110,403.

Process for treating mercaptan solutions—David L. Yabroff and John W. Givens, Berkeley, Calif., assignors to Shell Development Co. Filed Aug. 17, 1936. No. 2,110,412.

Process for absorption of nitrogen oxides from gases—Maarten Voogd, Beverwijk, Netherlands, assignor to Shell Development Co. Filed Aug. 3, 1934. No. 2,110,431.

Upper cylinder lubricant—Alexander Duckham, London, England, assignor to Alexander Duckham & Co. Ltd., same place. Filed Nov. 16, 1936. No. 2,110,503.

Production of alcohols from petroleum—Joseph J. Pelc, Chicago, Ill. Filed June 3, 1936. No. 2,110,816.

* * *

March 15, 1938

REFINING

Method of converting carbonaceous and hydrocarbonaceous products into products of a low boiling point—Michael Melamid, Zehlendorf, Germany. Filed July 21, 1934. No. 2,110,887.

Electrical method for manufacturing sulphonated oils—William Woelflin, Long Beach, Calif., assignor to Petroleum Rectifying Co. Filed Dec. 26, 1933. No. 2,110,899.

Method of treating hydrocarbon oil—William F. Moore, Bayside, N. Y., assignor to Gasoline Products Co. Filed Nov. 28, 1932. No. 2,111,222.

Process of cracking hydrocarbons such as for production of high-grade so-called antiknock motor fuel—Henry C. Pennrich, Brussels, Belgium. Filed Feb. 26, 1935. No. 2,111,223.

Cracking of petroleum oil—David G. Brandt, Westfield, N. J., assignor to Power Patents Co. Filed July 27, 1932. No. 2,111,354.

Extraction process—Frank C. Cutting, Normandy, Mo., assignor to Shell Development Co. Filed May 21, 1935. No. 2,111,360.

Conversion of hydrocarbon oils—Jacque C. Morrell, Chicago, Ill., assignor to Universal Oil Products Co. Filed Jan. 30, 1936. No. 2,111,401.

Process for sweetening hydrocarbon oils—Lovell V. Chaney and Albert E. Buell, Bartlesville, Okla., assignors to Phillips Petroleum Co. Filed July 25, 1936. No. 2,111,487.

Process of dewaxing—Leo D. Jones, Philadelphia, Pa., assignor to Sharples Specialty Co. Filed Feb. 1, 1936. No. 2,111,508.

MISCELLANEOUS

Hydration of olefines and catalyst therefor; catalytic hydration of olefines to alcohols; catalytic hydration of olefines, and manufacture of catalytic material suitable for vapor phase hydration of olefines—Walter J. Joshua, Cheam, Herbert M. Stanley, Tadworth, and John B. Dymock, Sutton, England. Filed Oct. 4, 1933, Jan. 19, 1934, Aug. 2, 1934, and May 14, 1935. Nos. 2,110,878, 2,110,879, 2,110,880 and 2.110,881.

Manufacture of stable paraffin—Robert E. Burk and Herman P. Lankelma, Cleveland, Ohio, assignors to Standard Oil Co. (Ohio). Filed Feb. 10, 1936. No. 2,110,950.

Motor fuels and methods of making them—Vaman R. Konatnur, New York, N. Y., assignor to Autoxygen Inc., same place. Filed Aug. 26, 1935. No. 2,111,100.

Substances producing fluorescence (in oils)—Hans Rabe, Germany, assignor to I. G. Farbenindustrie. Filed Nov. 26, 1933. No. 2,111,126.

BRADFORD OIL REFINING COMPANY

Announces the completion of its

New Lubricating Plant

Latest improved type of equipment and process
Highest quality of products

Refined exclusively from

Famous Bradford, Pennsylvania Premium Crude

We offer:

HIGH FLASH CYLINDER STOCKS
SOLVENT DEWAXED BRIGHT STOCKS
NEUTRALS — MOTOR OILS

In tank cars, drums and cans

We solicit your inquiries

BRADFORD OIL REFINING COMPANY
BRADFORD, PENNSYLVANIA

First Prize In Garden Club Contest

Good housekeeping, well-kept lawns and flower beds carrying out the company color scheme, won first prize for the service station of D. B. Haggerty, Standard Oil Co. of New Jersey dealer, in a 1937 garden club contest in Memphis. The contest was sponsored by a Memphis newspaper and the Shelby County Council of Garden Clubs.

Landscaping, as the accompanying photograph shows, was not elaborate, but was neat, attractive, and well placed. Also, a natural background of trees and shrubs helped to set off the station.

The flowerbeds, planted in red, white and blue petunias and barberry, tied in with the Standard's color scheme. There were three beds at one side of the lawn, the middle bed containing red and white flowers, and the end beds red, white and blue. Another side of the lawn had a combination of red, white and blue petunias and red barberry. A few neatly trimmed shrubs added to the station's appearance. There is a scarcity of signs at the station, doubtless a point considered in awarding the prize.

100% Pennsylvania Motor Oils

To the buyers of quality Motor Oils who desire a source of supply that can furnish them material which will command leadership at competitive prices.

We ask that before purchasing, you will allow us to present our contract and spot offerings—both on blended oils of any specifications as well as Bright Stocks, Neutral Oils, and high flash Cylinder Stocks.

JAMES B. BERRY SONS' CO., INC. OIL CITY, PA.

Branch Offices: **New York City; Chicago, Ill.; Boston, Mass.; Philadelphia, Pa.; Houston, Texas; London, England; Hamburg, Germany; The Hague, Holland.**

Refineries: **Oil City, Pa.; Emlenton, Pa.; Farmer's Valley, Pa.; St. Mary's, W. Va.**
Ocean Terminals: **Baltimore, Md.; Tiverton, R. I.; Dorchester, Mass.; Carteret, N. J.; Edgewater, N. J.; Glastonbury, Conn.; Philadelphia, Pa.**

Markets

At A Glance . . .

MID-WESTERN: Chicago trade reports gasoline firm.
MID-CONTINENT: Curtailed runs bring refiners in market.
EASTERN: Holiday demand increases gasoline shipments.
PENNSYLVANIA: Bright stock and neutrals down 1 to 1.5 cents.
GULF: Foreign demand light; domestic gasoline active.
CALIFORNIA: Heavy fuels sell lower; Jap Navy inquires.

Mid-Continent

N. P. N. News Bureau

TULSA, May 31. — Mid-Continent gasoline market was hitting its spring stride last week, refiners said, as consumption increased and output remained steady.

Curtailed crude production and prospects for deeper cuts in June have gone far toward discouraging increased refinery runs, it was said. With gasoline consumption reported almost up to the seasonal par, stocks, especially at independent refineries, were gradually being reduced, according to reports.

Four Mid-Continent refiners reported making substantial purchases of gasoline in the open market. Supplies were closely held, they said.

Harvesting already has begun in the extreme southern part of the grain belt, and jobber inquiry for third grade gasoline, tractor fuel and kerosine was reported on the increase. Jobbers in the wheat belt were anticipating a good crop and increased gasoline consumption.

Natural gasoline demand was more active last week, and some sales were reported 0.125 cent higher at 2.125 cents.

Shipments of lubricating oil against contracts were said to be heavier. Open market demand, however, continued light. Cargo buyers of lubes were in the market although no new business was reported last week.

Coastal

N. P. N. News Bureau

NEW YORK, May 31. — Market conditions at the American Gulf were without material change the last week of May.

Foreign buying, and inquiries from exporters, continued to be conspicuous by their absence. Traders here felt that the current lack of interest was due more to the lessening of demand for petroleum products in foreign markets, rather than to a switch in the source of supply. They pointed out that while for some time Roumania had taken the play away from American Gulf suppliers, shipments the past month or more from Roumania have taken considerable material, and prices now are equivalent to prevailing Gulf prices on shipments to most countries.

High octane gasoline for domestic shipment continued to be the outstanding product in the Gulf market. Purchases of this product the past month have been large, and no excess offerings were reported on the market.

Some suppliers continued to talk higher prices for No. 2 heating oil and export gas oil. Some said they were holding this oil for 3.5 cents, but no changes were apparent in general quotations the past week.

Grade C bunker oil was relatively well held at 70 cents per barrel, f.o.b. the Gulf, according to most reports. Movement of this oil was spotty.

Mid-Western

N. P. N. News Bureau

CHICAGO, May 30. — The increased gasoline demand which usually preludes Memorial Day motoring was well up to expectations, Chicago sellers reported the last week of May. All grades of gasoline appeared firm, they said, with low octane gasoline particularly difficult to obtain.

Current quotations for 70-72 octane gasoline ranged from 4.625 to 5.125 cents, some sellers having advanced their prices from 5 to 5.125 cents during the week. Majority of marketers looked for continued active gasoline demand throughout the summer months.

Michigan straight run gasoline, which showed signs of easing off earlier in the week, displayed considerable strength as the week ended, refiners reported. Supplies of this grade generally were said to be ample, although in a few instances scarcity was reported.

Higher octane grades were active and prices generally were unchanged, reports indicated.

While demand for kerosine was said to have lagged in some instances, the general price structure remained steady during the past week, Chicago sellers stated. Tractor fuels continued in good demand.

The Michigan farm trade continued to display active interest in kerosine, refiners said. Tractor fuels also were active although recent rains and bad weather have curtailed to some extent the movement of these fuels.

Range oil shipments were slow; prices generally steady.

N.P.N. Gasoline Index

	Dealer T.w. Cents per	Tank Car gal.
May 31	10.16	5.85
Month ago	10.21	5.91
Year ago	10.67	6.75

Dealer index is an average of "undivided" dealer prices, ex-tax, in 50 cities.

Tank car index is a weighted average of 12 wholesale markets for regular-grade gasoline.

Pennsylvania

N. P. N. News Bureau

CLEVELAND, May 31. — A 1 to 1.5-cent decrease in prices of all grades of neutral oil and bright stock, and a 0.05-cent rise in wax prices were highlights of the western Pennsylvania refinery market the last week of May. Gasoline and kerosine were steady. Fuel oil remained easy.

The reduced prices for lubricating oils reported by several refiners brought the key grades — 25 pour test — of bright stock, 200 and 150 neutral oil down to 12 cents, 13 cents and 11.5 cents, respectively. The lower pour test neutral oils also were offered 1 cent lower and the lower pour test bright stocks were down 1.5 cents.

Several refiners said they believed prices now were touching bottom. A number of plants have been shut down and curtailed crude runs have been scheduled for June at many others.

Buyers showed more interest in the market following the last drop in prices, according to reports. One refiner reported receiving shipping instructions for 100,000 gallons of bright stock from a contract customer who had not taken any material against his contract for several weeks. Several refiners said that inter-refinery prices, particularly for bright stock, were closer to the level of quotations to jobbers than had been the case for some time, substantiating their belief, they said, that the downward swing had about run its course.

All reports indicated heavy shipments of gasoline and a steady pick-

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). Prices in cents per gallon except heavy fuel oils in dollars per barrel of 42 gallons, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included, unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Gasoline

Prices Effective	May 31	May 23
OKLAHOMA		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.25 – 4.50	4.25 – 4.50
63-66 oct.	4.50 – 4.625	4.50
67-69 oct.	4.75 – 5.00	4.75 – 5.00
70-72 oct.	5.00 – 5.50	5.00 – 5.50
60-62, 400 e.p.	4.25 – 4.375	4.25 – 4.375
WESTERN PENNA.		
Bradford-Warren:		
Motor gasoline:		
U. S. Motor (58-62°)	5.25 – 5.375	5.25 – 5.375
Min. 65 oct.	6.50 – 7.00	6.50 – 7.00
Other districts:		
Motor gasoline:		
U. S. Motor (58-62°)	5.25	5.25
Min. 65 oct.	6.50 – 6.625	6.50 – 6.625
CENTRAL MICHIGAN (a)		
Str.-Run Gasoline	(c) 5.25-5.50	(c) 5.25-5.50
U. S. Motor: (Octane L-3)		
67-69 octane	(e)7.50	(e)7.50
70-72 octane	8.00 – 8.25	8.00 – 8.25
CALIFORNIA (3c tax to be added if used in state)		
U. S. Motor:		
54-58, for instate shipment	7.00 – 9.25	7.00 – 9.25
54-58, for outside state shipment	7.00 – 9.00	7.00 – 9.00
58-61, 375-400 e.p., 65 oct. & above	7.75 – 9.75	
N. TEX. (b)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.25 – 4.50	4.25 – 4.50
63-66 oct.	4.50 – 5.25	4.50 – 5.25
67-69 oct	5.00 – 5.625	5.00 – 5.625
70-72 oct	5.25 – 5.625	5.25 – 5.625
60-62, 400 e.p.	4.25 – 4.50	4.25 – 4.50
KANSAS (For Kansas destinations only)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.375– 4.625	4.375– 4.625
70-72 oct.	5.375– 5.625	5.375– 5.625
W. TEX. (b)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.50 – 4.875	4.50 – 4.875
63-66 oct.	5.00 – 5.375	5.00 – 5.375
67-69 oct.	5.375– 5.75	5.375– 5.75
70-72 oct.	5.625– 6.125	5.625– 6.125
E. TEX.		
60-62, 400 e.p.	4.50	4.50
N. LA. (For shipment to La. & Ark.)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.375– 4.50	4.375– 4.50
63-66 oct	(e) 4.75 –5.00	4.75 – 5.00
67-69 oct.	(e)5.125	(e)5.125
70-72 oct.	5.625	5.625
ARKANSAS (F.o.b. Ark. plant of one refiner, for shipment to Ark. & La.)		
U. S. Motor: (Octane L-3)		
62 octane & below	4.50	4.50
67-69 oct.	5.00	5.00
OHIO (Quotations of S. O. Ohio. Delivered anywhere in Ohio).		
U. S. Motor	8.00	8.00
Above 65 oct.	8.25	8.25

Natural Gasoline

(Prices to blenders on freight basis shown below. Shipments may originate in any Mid-Continent manufacturing district.)

F.O.B. GROUP 3		
Grade 26-70	2.125	2.00 – 2.125
F.O.B. BRECKENRIDGE		
Grade 26-70	2.00 – 2.125	2.00 – 2.125
CALIFORNIA (F.o.b. plants in Los Angeles basin)		
75-85, 350-375 e.p. for blending	7.00 – 7.25	7.00 – 7.25

Kerosine

Prices Effective	May 31	May 23
WESTERN PENNA.		
Bradford-Warren:		
45 w.w.	5.125– 5.25	5.125– 5.25
46 w.w.	5.25 – 5.375	5.25 – 5.375
Other districts:		
45 w.w.	5.00 – 5.25	5.00 – 5.125
46 w.w.	5.125	5.125
47 w.w.	5.25 – 5.375	5.25 – 5.375
CENTRAL MICHIGAN (a)		
47-49 w.w.	5.00 – 5.25	5.00 – 5.30
OKLAHOMA		
41-43 w.w.	4.125– 4.25	4.125– 4.25
42-44 w.w.	4.375– 4.50	4.375– 4.50
KANSAS (For Kansas destinations only).		
41-43 w.w.	4.375– 4.625	4.375– 4.625
42-44 w.w.	4.625– 4.875	4.625– 4.875
N. TEX. (b)		
41-43 w.w.	4.25 – 4.50	4.25 – 4.50
E. TEX.		
41-43 w.w.	4.00 – 4.125	4.00 – 4.125
N. LA. (For shipment to La. and Ark.)		
41-43 w.w.	4.25 – 4.50	4.25 – 4.50
ARK. (F.o.b. Ark. plant of one refiner, for shipment to Ark. and La.)		
41-43 w.w.	4.625	4.625
CALIFORNIA		
40-43 w.w.	5.50 – 7.00	5.50 – 7.00

Gas *and* Fuel Oils

WESTERN PENNA.		
Bradford-Warren:		
36-40	3.75 – 4.00	3.875– 4.00
Other districts: (Excluding Pittsburgh District Prices).		
36-40	3.375– 3.50	3.50 – 3.75
CENTRAL MICHIGAN (a)		
P.W. Distillate	4.00 – 4.75	4.00 – 4.75
No. 3 gas oil, Str.	3.75 – 4.50	4.25 – 4.50
U.G.I. gas oil	3.50 – 4.25	3.50 – 4.25
Fuel Oils (Vis. at 100):		
500-700 Vis.	(d) 2.00 –2.125	(d) 2.125–2.625
300-500 Vis.	(d) 2.125–2.25	(d) 2.25 –2.75
100-300 Vis.	(d) 2.50 –2.625	(d) 2.75 –3.25
OKLAHOMA		
No. 1 prime white	3.75 – 3.875	3.75 – 3.875
No. 2 straw	3.375– 3.625	3.375– 3.625
U. G. I. gas oil	(d) 3.00 –3.25	(d) 3.00 –3.25
28-30 zero	3.25 – 3.375	3.25 – 3.375
24-26	(e)$0.925	(e)$0.925
18-22	(d) $0.775-$0.85	(d) $0.80-$0.85
14-16	(d) $0.70-$0.80	(d) $0.75-$0.825
KANSAS (For Kans. destinations only).		
No. 1 p.w. fuel oil	4.125– 4.375	4.125– 4.375
10-14 fuel oil	$0.55 –$0.65	$0.55 –$0.65
N. TEX. (b)		
No. 1 white	4.00 – 4.25	4.00 – 4.25
N. LA. (For shipment to La. and Ark.)		
No. 2	3.25 – 3.50	3.25 – 3.50
20-24	$1.10 –$1.15	$1.10 –$1.15
16-20	$0.90 –$0.95	$0.90 –$0.95
10-14	$0.80 –$0.85	$0.80 –$0.85
ARK. (F.o.b. Ark. plant of one refiner, for shipment to Ark. and La.)		
No. 2	3.625	3.625
28-30 gas oil, zero	3.375	3.375
CALIFORNIA		
San Joaquin Valley:		
Heavy fuel	$0.60 –$0.75	$0.60 –$0.75
Light fuel	$0.75 –$0.85	$0.75 –$0.85
Diesel fuel (per gal.)	3.25 – 4.00	3.25 – 4.00
Stove dist. (per gal.)	3.75 – 6.00	3.75 – 6.00
Los Angeles:		
Heavy fuel	$0.55 –$0.90	$0.60 –$0.90
Light fuel	$0.70 –$1.00	$0.75 –$1.00
Diesel fuel (per gal.)	2.75 – 4.00	2.75 – 4.00
Stove dist. (per gal.)	3.00 – 6.00	3.00 – 6.00
San Francisco:		
Heavy fuel	$0.95	$0.95
Light fuel	$1.05	$1.05
Diesel fuel (per gal.)	4.50	4.50
Stove dist. (per gal.)	6.50	6.50

Note: All above heavy fuels meet Pacific specification 400; light fuel, spec. 300; Diesel fuels, spec. 200; and stove distillate, spec. 100.

Neutral Oils

Prices Effective	May 31	May 23
WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only.)		
Viscous Neutrals No. 3 col. (Viscosity at 70° F.)		
200 Vis. (180 at 100°) 420-425 fl.		
0 p.t.	16.00	16.00 –17.00
10 p.t.	15.00	15.00 –16.00
15 p.t.	14.50	14.50 –15.50
25 p.t.	13.00	13.00 –14.00
150 Vis. (143 at 100) 400-405 fl.		
0 p.t.	14.50	14.50 –15.50
10 p.t.	13.50	13.50 –14.50
15 p.t.	13.00	13.00 –14.00
25 p.t.	11.50	11.50 –12.50
SOUTH TEXAS		
Vis. Color		
Pale Oils: (*Vis. at 100° F.*)		
100 No. 1½-2½	4.75 – 5.00	4.75 – 5.00
200 No. 2-3	6.25 – 6.75	6.25 – 6.75
300 No. 2-3	6.75 – 7.25	6.75 – 7.25
500 No. 2½-3½	7.75 – 8.25	7.75 – 8.25
750 No. 3-4	8.25 – 8.75	8.25 – 8.75
1200 No. 3-4	8.75 – 9.25	8.75 – 9.25
2000 No. 4	9.00 – 9.50	9.00 – 9.50
Red Oils:		
200 No. 5-6	6.25 – 6.75	6.25 – 6.75
300 No. 5-6	6.75 – 7.25	6.75 – 7.25
500 No. 5-6	7.75 – 8.25	7.75 – 8.25
750 No. 5-6	8.25 – 8.75	8.25 – 8.75
1200 No. 5-6	8.75 – 9.25	8.75 – 9.25
2000 No. 5-6	9.00 – 9.50	9.00 – 9.50

Note: Red oil prices cover oils with green cast; blue cast red oils are slightly lower in some cases.

MID-CONTINENT (Vis. at 100° F.; F.o.b. Tulsa basis).

Pale Oils: (0 to 10 P.P.) Vis. Color		
60-85—No. 2	5.50	5.50
86-110—No. 2	6.00	6.00
150—No. 3	9.00	9.00
180—No. 3	10.00	10.00
200—No. 3	10.50	10.50
250—No. 3	11.50	11.50
280—No. 3	12.50	12.50
300—No. 3	13.00	13.00
Red Oils:		
180—No. 5	(e)9.00	(e) 9.00
200—No. 5	9.50 –10.00	9.50 –10.00
280—No. 5	11.50 –11.75	11.50 –11.75
300—No. 5	(e)11.75	(e)11.75

Note: The following oils, of 15 to 25 p.p., are generally quoted these amounts under 0-10 p.p.: viscous oils, 0.5c; non-viscous, 0.25c. Viscous oils (150-300 vis.), No. 4 color, generally are quoted 0.5c above No. 5 color oils.

CHICAGO (Vis. at 100° F.)

Pale Oils 0 to 10 p.p.: Vis. Color		
60-85—No. 2	7.25	7.25
86-110—No. 2	7.75	7.75
150—No. 3	10.00	10.00
180—No. 3	11.00	11.00
200—No. 3	11.50	11.50
250—No. 3	12.50	12.50
Red Oils:		
180—No. 5	10.00	10.00
200—No. 5	10.50	10.50
250—No. 5	11.50	11.50
280—No. 5	12.50	12.50
300—No. 5	12.75	12.75

Note: Viscous oils, 15 to 30 p.p. are quoted 0.5c lower; 60-85 and 86-110 No. 2 non-viscous oils, 15 to 30 p.p., 0.25c lower. To obtain delivered prices in Chicago, add 0.25c per gal.

Cylinder Stocks

MID-CONTINENT (F.o.b. Tulsa basis).

Bright Stocks:		
190-200 Vis. at 210° D	(e)19.00	(e)19.00
150-160 Vis. at 210° D:		
0 to 10 p.p.	14.50 –16.00	14.50 –16.00
10 to 25 p.p.	13.50 –15.50	13.50 –15.50
25 to 40 p.p.	13.50 –15.00	13.50 –15.00
150-160 vis. at 210° E.	12.50 –15.00	12.50 –15.00

(a) Prices f.o.b. Central Michigan refinery group basis, for shipment within Mich. Shipments may originate at plants outside Central group. (b) For shipment to Texas and New Mexico destinations; Group 3 prices quoted on northern shipments. (c) Excluding Detroit shipment. (d) Nominal. (e) Only one refiner quoting. (f) No price reported.

-this is the customer
this is the station attendant
this is the Jobber
-this is the transportation
this is the canning plant
-this is the refinery
-this is the Crude
-this is the chemist
JOBBERS: WRITE, WIRE or PHONE today for complete details of the Exclusive Territory Franchise offered by THE OHIO OIL COMPANY.
-that makes the oil that's trouble-free!
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GENERAL OFFICES FINDLAY, OHIO
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GENERAL OFFICES - - - FINDLAY, OHIO

ROBINSON, ILLINOIS TULSA, OKLAHOMA FT. WORTH, TEXAS

up in kerosine movement. Prices for the most part were steady.

Both refiners and resale agents reported more numerous inquiries for wax. Sales were reported at 1.9 to 2 cents a pound, New York, up 5 points on the low end of the market.

California

N. P. N. News Bureau

LOS ANGELES, May 28. — California petroleum markets showed some improvement the past week as better crude curtailment compliance combined with a pick-up in domestic gasoline demand to ease crowded storage facilities.

Heavy oils continued slow and prices were somewhat lower on a few odd lots. Sales of fuel oil below 55 cents a barrel and of gas oil below 2.75 cents a gallon, were reported.

Independent plants in the Los Angeles Basin for the most part quoted 7 cents a gallon at the rack for competitive grades of motor fuel. Little, if any, gasoline was reported offered below this figure.

Inquiry reported by suppliers in the offshore market was almost nonexistent, but there was considerable interest and speculation on bids to be opened next week on 670,000 barrels of fuel oil for the Japanese Navy. Generally considered a slightly better grade than U. S. Navy fuel oil, this oil is expected to be offered at a figure somewhat higher than the average of about 65 cents recently quoted on 7,000,000 barrels of U. S. Navy fuel.

The Japanese government was also showing some interest in California crude with aviation gasoline content. Indications late in the week were that a tender for about 100,000 tons of this crude would be held up right now, for one reason or another, but that this buyer was again definitely interested in West Coast oil.

Quotations on cargo movement of gasoline were unchanged from a week ago. No spot sales were reported.

Eastern

N. P. N. News Bureau

NEW YORK, May 31. — Gasoline buying early in the last week of May was somewhat brisker at eastern seaboard markets, according to reports of suppliers. Heavier buying generally was in anticipation of heavy consumption over Memorial Day.

With the exception of occasional rains, weather conditions throughout the east have been ideal for motoring, and it was generally expected that large drafts from storage would result from the three-day holiday.

A strike of barge employes in the New York harbor market was short-lived, and had no ill effect on the

(Continued on page 76)

Fuel Oil . . . . .

TULSA, May 31. — A heavy wheat crop has been predicted, and southwestern railroads already have begun moving "empties" into the wheat belt preparatory to movement of crop to market. With last year's experience as a guide, the roads last week were lining up sources of supply for heavy railroad fuel.

In addition to oil moving against contracts, large quantities were being bought in the open market, it was reported. Increased demand was expected to relieve refiners of some of the burdensome stocks piled up the past month or two. Purchases of heavy fuel for road oil also have increased.

Light fuels were in light demand, although few refiners were inclined to push these oils into the open market. Storage buying against next winter's demand has not yet begun and as result light fuel was going to storage at some plants. Other refiners were turning this stock into kerosine and tractor fuel, movement of which was brisk, they said.

* * *

NEW YORK, May 31. — Eastern seaboard fuel oil markets continued to feel the pinch of inactivity, and prices were lowered in some districts the last week of May.

Reductions of 0.25 cent were made May 25 by most suppliers in the Baltimore and Philadelphia markets for Nos. 1 to 4 oils.

Consumer demand for domestic grades of heating oil was at a standstill as warm weather became general throughout the east.

Demand for heavy fuels continued extremely spotty in the face of restricted industrial activity, according to reports. Considerable shading of $1.05 for No. 6 oil has broken out in some of the key markets in the east, notably New York and Philadelphia, according to reports here.

* * *

CHICAGO, May 30. — Sultry weather the past week curtailed still further the movement of light fuels, Chicago marketers reported. Occasional small-lot shipments for domestic use were reported, but the chief movement was for storage, it was indicated.

Michigan refiners reported numerous inquiries for prime white distillate for storage purposes, but actual buying has not yet gotten under way.

Industrial fuels in the Chicago area continued in the doldrums, according to marketers. Continued lull in industrial operations has resulted in burdensome stocks, many refiners indicated.

Michigan refiners also reported excessive stocks of heavy fuels as automotive plants continued to operate at low production rate. Two refiners, however, reported sizable marine shipments to Canada.

Fall Meeting Date Set

DALLAS, May 28.—The annual meeting of the Texas Mid-Continent Oil & Gas Assn. will be held in San Antonio, Oct. 27, 28 and 29, according to George C. Gibbons, executive vice-president. The San Antonio Wildcat Committee, composed of local oil men, will arrange for headquarters and handle other preliminary details.

TANK WAGON MARKETS, HEATING OILS

Prices in Effect May 30, 1938

Following are posted tank wagon prices of various grades of heating oil at the points shown in various territories. Prices are in cents per gallon.

	No. 1	No. 2	No. 3	No. 4
S. O. NEW JERSEY				
Atlantic City, N. J.	8.0	6.0	....	6.0
Newark	8.0	6.0	....	6.0
Annapolis, Md.	....	6.25	....	....
Baltimore	7.5	6.5	....	6.5
Washington, D. C.	7.75	6.5	....	6.5
Norfolk, Va.	7.5	6.5	....	6.5
Petersburg	7.75	6.75	....	....
Richmond	7.75	6.75	....	6.75
Charlotte, N. C.	9.5	8.5	....	....
Hickory	....	8.75	....	....
Raleigh	9.5	8.0	....	....
Charleston, S. C.	8.5	7.0	....	....
Columbia	9.8	8.3	....	....
Spartanburg	10.7	9.2	....	....

	No. 1	No. 2	No. 3	No. 4
ATLANTIC REFINING Cont'd				
Philadelphia, Pa.	7.75	7.00	7.00	7.00
Allentown, Pa.	8.25	7.50	7.50	7.50
Wilmington, Del.	8.25	7.50	7.50	7.50
Springfield, Mass.	9.00	7.50	....	7.50
Worcester, Mass.	9.00	7.50	....	7.50
Hartford, Conn.	9.00	7.50	....	7.50
S. O. OHIO				
Columbus Division and Cleveland	7.50	7.50	7.00	...
City of Lima	8.00	8.00	7.00	....
Rest of Ohio	8.00	8.00	7.50	....

Note: S. O. Ohio prices are for full compartment hose dumps, bucket dumps are 0.5c per gallon higher.

SOCONY-VACUUM OIL CO. INC.

(S. O. New York Division)

New York City	(c)	7.50	7.50	7.50
Albany, N. Y.	(c)	7.50	7.50	7.50
Rochester, N. Y.	(c)	7.50	7.50	7.50
Boston, Mass.	(c)	7.00	7.00	7.00
Bangor, Me.	(c)	8.00	8.00	8.00
Manchester, N. H.	(c)	7.50	7.50	7.50
Burlington, Vt.	(c)	8.00	8.00	8.00
Hartford, Conn.	(c)	7.00	7.00	7.00
New Haven, Conn.	(c)	7.00	7.00	7.00
Providence, R. I.	(c)	7.00	7.00	7.00

(c) Prices for No. 1 fuel in Socony-Vacuum territory same as for kerosine which see in tank wagon table for various cities; prices change with kerosine.

S. O. INDIANA

Stanolax Fuel and Furnace Oils

	No. 1 Fuel	Stanolax Furnace
Chicago	(a)6.5	6.5
Indianapolis	...	(b)7.8
Detroit	...	7.1
Milwaukee	8.4	7.7
Minneapolis	7.8	7.8
St. Louis	7.7	7.0
Kansas City	6.8	6.8

(a) This price applies to 1 to 149 gals. deliveries; 150 to 399 gals., 7.1c; 400 gals. and over, 6.8c.

(b) Excluding 4c state tax.

Note: Small-lot deliveries of light fuel oils range up to 2c higher than above quotations.

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days) unless otherwise stated. Prices in cents per gallon, except heavy fuel oils in dollars per barrel of 42 gallons, wax and petrolatums in cents per pound in barrels, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Cylinder Stocks (cont'd)

Prices Effective	May 31	May 23
Mid-Continent (cont'd)		
120 Vis. at 210° D		
0 to 10 p.p.	14.50 -15.125	14.50 -15.125
25 to 40 p.p.	(e)14.25	(e)14.25
600 S.R. Dark Green	5.00 - 7.50	5.00 - 7.50
600 S.R. Olive Green	7.00 - 7.50	7.00 - 7.50
631 S.R.	(e)12.50	(e)12.50
Black Oil	3.50 - 4.00	3.50 - 4.00
CHICAGO (Viscosity at 210°)		
Unfiltered Steam Refined:		
140	9.00	9.00
160	10.00	10.00
200	11.00	11.00
Bright stocks, 160 vis. at 210. No. 8 color:		
0 to 10 p.p.	15.75	15.75
15 to 25 p.p.	14.75	14.75
30 to 40 p.p.	14.25	14.25
E filtered Cyl. Stock	13.50	13.50

Note: To obtain prices delivered in Chicago, add 0.25c per gal.

Prices Effective	May 31	May 23
WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only.)		
600 S.R. filterable	8.50 - 9.50	8.50 - 9.50
650 S.R.	10.50 -11.50	10.50 -11.50
600 fl.	11.00	11.00
630 fl.	14.00	14.00
Bright stock, 145-155 vis. at 210°, 540-550 flash, No. 8 color:		
10 p.t.	14.50	14.50 -15.50
15 p.t.	13.50	13.50 -14.50
25 p.t.	12.00	12.00 -13.00

Petrolatums

WESTERN PENNA. (In bbls., carloads; in tank cars, 0.5c less)		
Snow White	6.125- 6.25	6.125- 6.25
Lily White	5.125- 5.25	5.125- 5.25
Cream White	4.125- 4.25	4.125- 4.25
Light Amber	2.625- 2.75	2.625- 2.75
Amber	2.375- 2.50	2.375- 2.50
Red	2.00 - 2.25	2.00 - 2.25

Wax

Prices Effective	May 31	May 23
WESTERN PENNA. (In bbls., carloads, New York)		
122-124 A.m.p., w.c. scale	1.90 - 2.00	1.85 - 2.00
124-126 A.m.p., w.c. scale	1.90 - 2.00	1.85 - 2.00
OKLAHOMA (In bbls. or burlap bags, carloads)		
124-126 A.m.p., w.c. scale	2.10 - 2.25	(a) 2.10 -2.25
CHICAGO (In bags, carload lots. Melting points are E.M.P. (A.S.T.M.) methods; add 3° F. to convert into A.m.p.)		
Fully refined:		
122-124	4.45	4.45
125-127	4.55	4.55
127-129	4.65	4.65
130-132	(d)5.10	(d)5.10
132-134	(d)5.35	(d)5.35
135-137	(d)6.10	(d)6.10

(a) Nominal. (b) Only one refiner quoting. (c) No price reported. (d) Same prices quoted in bags or slabs loose.

MID-WESTERN TANK CAR MARKET

(*Prices group 3 basis; origin of shipments unknown*)

Gasoline

Prices Effective	May 31	May 23
U. S. Motor: (Octane L-3)		
62 oct. and below	4.125- 4.375	4.125- 4.375
63-66 oct.	4.375- 4.625	4.375- 4.625
67-69 oct.	4.625- 4.875	4.625- 4.875
70-72 oct.	4.625- 5.125	4.625- 5.00

Kerosine

41-43 w.w.	4.00 - 4.25	4.00 - 4.25
42-44 w.w.	4.125- 4.50	4.125- 4.50

(a) Nominal.

Fuel and Gas Oils

Prices Effective	May 31	May 23
Domestic:		
No. 1 p.w.	3.625- 3.875	3.625- 3.875
No. 1 straw	3.375- 3.75	3.375- 3.75
No. 2 straw	3.25 - 3.50	3.25 - 3.50
No. 3	3.125- 3.25	3.125- 3.25
No. 4	(a) $1.05-$1.10	(a) $1.05-$1.10
No. 5	(a) $0.65-$0.75	(a) $0.65-$0.75
Range oil	3.75 - 3.875	3.75 - 3.875
Industrial:		
No. 4	(a) $0.90-$1.05	(a) $0.90-$1.05
No. 5	(a) $0.55-$0.65	(a) $0.55-$0.65

Prices Effective	May 31	May 23
Industrial (cont'd)		
No. 6	(a) $0.35-$0.50	(a) $0.35-$0.50
U. G. I. gas oil	2.625- 2.875	2.625- 2.875

Naphtha and Solvent

Stoddard solvent	5.875	5.875
Cleaners' naphtha	6.375	6.375
V. M. & P. naphtha	6.375	6.375
Mineral spirits	5.375	5.375
Rubber solvent	6.375	6.375
Lacquer diluent	7.375	7.375

DAILY GASOLINE PRICES

Daily range of gasoline prices as reported in PLATT'S OILGRAM (Week Ended May 27, 1938)

U. S. Motor, (Octane Number determined according to L-3 Method in Okla., Texas and Mid-Western Districts):	May 23	May 24	May 25	May 26	May 27
62 octane and below:					
Oklahoma	4.25 - 4.50	4.25 - 4.50	4.25 - 4.50	4.25 - 4.50	4.25 - 4.50
(b)North Texas	4.25 - 4.50	4.25 - 4.50	4.25 - 4.50	4.25 - 4.50	4.25 - 4.50
West Texas	4.50 - 4.875	4.50 - 4.875	4.50 - 4.875	4.50 - 4.875	4.50 - 4.875
Mid-Western (Group 3 basis)	4.125- 4.375	4.125- 4.375	4.125- 4.375	4.125- 4.375	4.125- 4.375
63-66 octane:					
Oklahoma	4.50	4.50	4.50	4.50 - 4.625	4.50 - 4.625
(b)North Texas	4.50 - 5.25	4.50 - 5.25	4.50 - 5.25	4.50 - 5.25	4.50 - 5.25
West Texas	5.00 - 5.375	5.00 - 5.375	5.00 - 5.375	5.00 - 5.375	5.00 - 5.375
Mid-Western (Group 3 basis)	4.375- 4.625	4.375- 4.625	4.375- 4.625	4.375- 4.625	4.375- 4.625
67-69 octane:					
Oklahoma	4.75 - 5.00	4.75 - 5.00	4.75 - 5.00	4.75 - 5.00	4.75 - 5.00
(b)North Texas	5.00 - 5.625	5.00 - 5.625	5.00 - 5.625	5.00 - 5.625	5.00 - 5.625
West Texas	5.375- 5.75	5.375- 5.75	5.375- 5.75	5.375- 5.75	5.375- 5.75
Mid-Western (Group 3 basis)	4.625- 4.875	4.625- 4.875	4.625- 4.875	4.625- 4.875	4.625- 4.875
70-72 octane:					
Oklahoma	5.00 - 5.50	5.00 - 5.50	5.00 - 5.50	5.00 - 5.50	5.00 - 5.50
(b)North Texas	5.25 - 5.625	5.25 - 5.625	5.25 - 5.625	5.25 - 5.625	5.25 - 5.625
West Texas	5.625- 6.125	5.625- 6.125	5.625- 6.125	5.625- 6.125	5.625- 6.125
Mid-Western (Group 3 basis)	4.625- 5.00	4.625- 5.00	4.625- 5.00	4.625- 5.125	4.625- 5.125
Motor Gasoline, 60-64 oct.					
New York harbor	(a) 6.25- 6.50	(a) 6.25- 6.50	(a) 6.25- 6.50	(a) 6.25- 6.50	(a) 6.25- 6.50
Philadelphia district	(a) 6.25- 6.50	(a) 6.25- 6.50	(a) 6.25- 6.50	(a) 6.25- 6.50	(a) 6.25- 6.50
Baltimore district	(a) 6.25- 6.50	(a) 6.25- 6.50	(a) 6.25- 6.50	(a) 6.25- 6.50	(a) 6.25- 6.50
Motor Gasoline, 65 oct. & above:					
New York harbor	(a) 6.50- 6.75	(a) 6.50- 6.75	(a) 6.50- 6.75	(a) 6.50- 6.75	(a) 6.50- 6.75
Philadelphia district	(a) 6.50- 6.75	(a) 6.50- 6.75	(a) 6.50- 6.75	(a) 6.50- 6.75	(a) 6.50- 6.75
Baltimore district	(a) 6.50- 6.75	(a) 6.50- 6.75	(a) 6.50- 6.75	(a) 6.50- 6.75	(a) 6.50- 6.75
U. S. Motor, 58-62°:					
Bradford-Warren (Western Penna.)	5.25 - 5.375	5.25 - 5.375	5.25 - 5.375	5.25 - 5.375	5.25 - 5.375
Other districts (Western Penna.)	5.25	5.25	5.25	5.25	5.25
Motor Gasoline, Min. 65 oct.:					
Bradford-Warren (Western Penna.)	6.50 - 7.00	6.50 - 7.00	6.50 - 7.00	6.50 - 7.00	6.50 - 7.00
Other districts (Western Penna.)	6.50 - 6.625	6.50 - 6.625	6.50 - 6.625	6.50 - 6.625	6.50 - 6.625

(a) Nominal.
(b) For shipment to Texas and New Mexico destinations; Group 3 prices are quoted on northern shipment.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline **do not include taxes;** *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include* 1c *federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect May* 30, 1938, *as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. New Jersey

Essolene (*Regular Grade*)

	Consumer Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Atlantic City, N. J.	7.25	8.75	4	8
Newark, N. J.	7.25	8.75	4	8
Annapolis, Md.	8.35	9.85	5	9.5
Baltimore, Md.	7.75	9.25	5	9
Cumberland, Md.	9.15	11.65	5	10
Washington, D. C.	8	9.5	3	9.5
Danville, Va.	8.45	10.95	6	12.9
Norfolk, Va.	7.25	9.75	6	11.5
Petersburg, Va.	7.55	10.05	6	11.7
Richmond, Va.	7.55	10.05	6	11.7
Roanoke, Va.	8.75	11.25	6	12.9
Charleston, W. Va.	8.55	11.05	6	12.6
Parkersburg, W. Va.	7.85	9.35	6	11.2
Wheeling, W. Va.	8.85	10.25	6	12.2
Charlotte, N. C.	9.15	11.65	7	12.6
Hickory, N. C.	9.65	12.15	7	13
Mt. Airy, N. C.	9.45	11.95	7	12.8
Raleigh, N. C.	8.75	11.25	7	12.1
Salisbury, N. C.	9.25	11.75	7	12.7
Charleston, S. C.	7.75	10.25	7	11.1
Columbia, S. C.	8.75	11.25	7	12.1
Spartanburg, S. C.	9.45	11.95	7	12.9

Discount to undivided dealers: Dealer t.w. price less 0.5c per gal.

Price basis to commercial consumers: To contract accounts, purchasing at least one full compartment at a time by hose connection: Effective March 12, 1937, in New Jersey, and March 8 in Maryland, District of Columbia, and in Arlington and Fairfax Counties in Virginia, on yearly purchases: from 2,500 to 100,000 gals., consumer t.w. price at time and place of delivery; 100,000 gals. per year consumer tank car price, plus 0.5c per gal. Generally consumer t.w. price in foregoing states is equivalent of dealer t.w. price, less 0.5c per gal.

Effective May 15, 1937, on Essolene and Esso (by tank wagon) in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax Counties, which see above), commercial consumers taking deliveries of 50 gals. (West Va. 100 gals.) or more at one time will be billed at the posted consumer t.w. price. Deliveries less than 50 gals. (West Va. 100 gals.) will be billed at 4c per gal. over posted consumer t.w. price. Generally, posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Kerosine Discount: 1c off t.w. price for 25 gals., or more, under contract thru territory (Baltimore City contract not necessary) except no discount in state of New Jersey.

Socony-Vacuum Oil Co., Inc.

(*S. O. New York Division*)

Socony Mobilgas (*Regular Grade*)

	Consumer Tank Car	"Split" Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Metropolitan N. Y. City: Boroughs of Manhattan, Bronx and Brooklyn (Kings and Queens)	7.5	9.5	*5	8.75
Borough of Richmond (Staten Is.)	7.5	9.5	*5	8.75
Albany, N. Y.	7.5	9.5	5	9
Binghamton, N. Y.	8.7	10.3	5	9
Buffalo, N. Y.	8	9	5	7.5
Jamestown, N. Y.	7.8	10.3	5	8.25
Plattsburg, N. Y.	7.9	9.9	5	9.5
Rochester, N. Y.	8.2	10	5	8.5
Syracuse, N. Y.	8.1	9.5	5	9
Danbury, Conn.	7.8	9.8	4	9
Hartford, Conn.	7.6	9.6	4	8.5
New Haven, Conn.	7.5	9.5	4	8
Bangor, Me.	8.5	10.3	5	9.5
Portland, Me.	8	10.1	5	8.75
Boston, Mass.	7.75	9	4	8.5
Concord, N. H.	8.8	11	5	9.5
Lancaster, N. H.	9.7	12	5	10.25
Manchester, N. H.	8.6	10.5	5	9
Providence, R. I.	7.75	9.3	4	8.5
Burlington, Vt.	8.4	10.4	5	9.5
Rutland, Vt.	8.6	10.7	5	9

*Plus 2% city sales tax computed at time of each sale.

Discount to undivided dealers; 0.5c less than "split" dealer t.w.

Price basis to commercial consumers: Effective about Nov. 15, 1936 in New York and New England for tank wagon delivery: monthly purchases of 25,000 gals. or over, pay consumer tank car price at point of delivery, plus 0.5c gal.; monthly purchases of 5,000 to 25,000 gals., pay undivided dealer tank wagon price at point of delivery; monthly purchases of less than 5,000 gals., pay divided dealer tank wagon price at point of delivery. Private consumers pay undivided dealer tank wagon price at point of delivery, plus 2c gal.

Atlantic Refining

Atlantic White Flash Gasoline (*Regular Grade*)

	Commercial Tank Car	Dealer T.W.	S.S.	Gasoline Taxes	Kerosine T.W.
Philadelphia, Pa.	7.25	8.75	12	5	10
Pittsburgh	8	10	15	5	10.5
Allentown	7.75	9.25	**	5	10.5
Erie	8	9.5	**	5	10
Scranton	8	9.5	**	5	10.5
Altoona	8	10	**	5	10.5
Harrisburg	7.5	9	**	5	10.5
Williamsport	8	10	**	5	10.5
Dover, Del.	...	8.5	**	5	10.5
Wilmington	...	8.5	**	5	10.5
Boston, Mass.	...	9	**	4	8
Springfield, Mass.	...	9.5	**	4	8
Worcester, Mass.	...	10	**	4	8.5
Fall River, Mass.	...	9	**	4	8
Hartford, Conn.	...	9.6	**	4	7.5
New Haven, Conn.	...	9.5	**	4	8
Providence, R. I.	...	9	**	4	8
Atlantic City, N. J.	...	8.75	**	4	8
Camden, N. J.	...	8.75	**	4	8
Trenton, N. J.	...	8.75	**	4	8
Annapolis, Md	...	9.85	**	5	9.5
Baltimore, Md	...	9.25	**	5	9
Hagerstown, Md.	...	10.35	**	5	10
Richmond, Va.	...	10.05	**	6	11.7
Wilmington, N. C.	...	10.35	**	7	11.3
Brunswick, Ga.	...	10	**	7	*13
Jacksonville, Fla.	...	9.5	**	8	11

*Georgia has kerosine tax of 1c per gal., not included in above price.

**Atlantic Refining transferred stations to dealers; no prices available.

Discount to undivided dealers: Dealer t.w. less 0.5c per gal. except in Georgia and Florida, dealer t.w. and undivided dealer price is same.

Price basis to commercial consumers: consumers under contract, in Penna. and Delaware, effective Mar. 11, 1937, on yearly gasoline purchases taking full compartment hose deliveries, using 100,000 gals. or more per year, tank car price plus 0.5c per gal.; consumers taking less than 100,000 gals., undivided dealer price. Consumers under contract and not under contract, taking less than full compartment delivery, and consumers not under contract taking full compartment delivery, get divided dealer price. Consumers taking less than 25 gals., t.w. delivery, get 4c above undivided dealer price.

Discount on kerosine: Effective Oct. 29, 1936, in Pennsylvania and Delaware, 2c per gal. off t.w. price on t.w. deliveries of 25 gals. or more at one time.

S. O. Ohio

Sohio X-70 Gasoline (*Regular Grade*)

	Consumer T.W.	†Divided Dlr.	Gasoline Taxes	Kerosine T.W.
Ohio State-wide	11.5	10.5	5	*12
Counties where prices are below statewide:				
Columbiana, Defiance and Pickaway	11	10	5	....
Franklin, Knox, and Paulding:	10.5	9.5	5	....

Renown Gasoline (*Third Grade*)

Ohio State-wide	11	10	5	....
Counties where prices are below statewide:				
Columbiana, Defiance and Pickaway	10.5	9.5	5	....
Franklin, Knox, and Paulding:	10	9	5	....
Counties where prices are above statewide:				
Butler, Clermont, Darke, Greene, Hamilton, Miami, Montgomery, Preble and Warren:	11.5	10.5	5	....

S. O. Ohio Cont'd

Kerosine Prices

(*Off Statewide Level*)

Kerosine prices are off statewide level in the following counties:

Allen, Auglaize, Champaign, Columbiana, Darke, Geauga, Greene, Hardin, Logan, Mahoning, Mercer, Preble, Putnam, Shelby, Trumbull and Van Wert *11.5
Paulding *11
Ashtabula *10.5
Fayette, Madison, Pickaway, Portage and Summit *8.5

†This price also to authorized agents, exclusive of 0.5c rental. Discount to undivided dealers: 0.5c less than divided dealer t.w.

*Ohio has kerosine tax of 1c per gal., not included in above prices.

Commercial Tank Wagon Q.D.A. to contract accounts: Effective Oct. 20, 1937, thru Ohio (except in 30 counties), on monthly purchases, off posted consumer t.w. price: 0 to 999 gals., 0.5c; 1,000 to 19,999 gals., 1.5c; 20,000 gals. and over, 2.5c. The 30 counties where Q.D.A. differs from statewide are: Allen, Ashtabula, Auglaize, Butler, Champaign, Cuyahoga, Darke, Defiance, Erie, Fulton, Geauga, Hamilton, Hardin, Henry, Logan, Lorain, Lucas, Mahoning, Mercer, Ottawa, Paulding, Putnam, Sandusky, Scioto, Shelby, Trumbull, Van Wert, Washington, Williams and Wood.

Sales tax: Ohio's 3% sales tax, effective Jan. 27, 1935, is added "where assessable, to regular posted prices," S. O. Ohio says.

On kerosine, prices to resellers and commercial consumers are posted generally at 3c per gal. below consumer t.w. price in any quantity, when such prices are on statewide level.

S. O. Kentucky

Crown Gasoline (*Regular Grade*)

	Consumer T.W.	Net Dlr.	Gasoline Taxes	Kerosine T.W.
Covington, Ky.	12.5	9.5	6	11
Lexington, Ky.	13.5	10.5	6	11
Louisville, Ky.	13	10	6	10.5
Paducah, Ky.	13	10	6	10
Jackson, Miss.	12.5	9.5	7	*12
Vicksburg, Miss.	12.5	9.5	7	*12
Birmingham, Ala.	13	10	*8	12
Mobile, Ala.	12	9	*9	11
Montgomery, Ala.	12	10	*9	*12
Atlanta, Ga.	13	10	7	*12
Augusta, Ga.	14	11	7	*13
Macon, Ga.	14	11	7	*13.5
Savannah, Ga.	12.5	9.5	7	*11
Jacksonville, Fla.	12.5	9.5	8	11
Miami, Fla.	12.5	9.5	8	12.5
Pensacola, Fla.	13	10	*9	12
Tampa, Fla.	11.5	8.5	8	10.5

Kyso Gasoline (*Third Grade*)

Covington, Ky.	10.5	8	6	....
Lexington, Ky.	11.5	9	6	....
Louisville, Ky.	11	8.5	6	....
Paducah, Ky.	11.5	9	6	....
Jackson, Miss.	11	8.5	7	....
Vicksburg, Miss.	11	8.5	7	....
Birmingham, Ala.	11	8.5	*8	....
Mobile, Ala.	9.5	7	*9	....
Montgomery, Ala.	10.5	8	*9	....
Atlanta, Ga.	11	8.5	7	....
Augusta, Ga.	12	9.5	7	....
Macon, Ga.	12	9.5	7	....
Savannah, Ga.	10.5	8	7	....
Pensacola, Fla.	11	8.5	*9	....

Discounts to all tank wagon consumers: Effective Jan. 4, 1937, thru territory, on Crown gasoline, 3c per gal. below consumer t.w. price; on Kyso, 2.5c below, regardless of quantity purchased, per month.

Discounts on kerosine: Prices in Kentucky are net, but in other states subject to 2c discount.

**Taxes*: In the tax column is included these city and county gasoline taxes at the following points: Mobile, 2c city; Birmingham, 1c city; Montgomery 1c city and 1c county; Pensacola, 1c city. Georgia and Montgomery, Ala. have kerosine taxes of 1c per gal., and Mississippi 0.5c, not included in above prices.

Above prices include these inspection fees on both gasoline and kerosine, per gallon, figured on basis of 50 gallons per barrel:

Alabama, 1/40c on gasoline, 1/2c on kerosine; Arkansas, 1/5c per gal. in a single barrel, 1/20c per gal. in bulk; Florida, 1/8c; Illinois, 3/100c; Indiana, 1/5c per gal. in lots up to 25 bbls.; 2/25c per gal. in lots of 25 bbls. or more; Kansas, 1/50c, (3/50c can be charged to meet inspection department expenses); Louisiana, 1/32c; Minnesota, 1/25c; Missouri, 3/100c; Nebraska, 3/100c; Nevada, gasoline, 1/20c; North Carolina, 1/4c; North Dakota, 1/20c; Oklahoma, 2/25c per gal. in lots of more than 50 bbls., 1/5c in lots less than 50 bbls.; South Carolina, 1/8c; South Dakota, 1/10c; Tennessee, 2/5c; and Wisconsin, 1/25c.

Kerosine inspection fee only: Iowa, 3/50c; Michigan, 1/5c per gal.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline do not include taxes; *they do, however, include inspection fees as shown in general footnote. Gasoline taxes shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect May 30, 1938, as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. Indiana

Red Crown (*Regular Grade*)
Stanolind (*Third Grade*)

	Red Crown Cons. T.W.	Dealer Prices Red Crown	Stano-lind	Gaso-line Taxes	Kero-sine T.W.
Chicago, Ill.	11.6	9.6	8.4	4	10.5
Decatur, Ill.	11.6	10.1	8	4	10.5
Joliet, Ill.	11.6	10.1	8.4	4	10.5
Peoria, Ill.	11.6	10.1	9.6	4	10.5
Quincy, Ill.	11.4	9.9	8.8	4	10.3
Indianapolis, Ind.	12.3	10.8	8.9	5	*11.2
Evansville, Ind.	12.1	10.6	7.1	5	*11
South Bend, Ind.	12.6	11.1	9.2	5	*9.4
Detroit, Mich.	11.3	9.8	9.3	4	9
Grand Rapids, Mich.	10.8	9.8	9.8	4	9.7
Saginaw, Mich.	12.3	10.8	10.3	4	9.3
Green Bay, Wis.	12.4	10.9	10.2	5	10.3
Milwaukee, Wis.	11.8	10.3	9.5	5	10.7
La Crosse, Wis.	12	10.5	10	5	10.9
Minneapolis-St. Paul	12	10.5	10	5	10.9
Duluth, Minn.	12.4	10.9	10.4	5	11.3
Mankato, Minn.	12	10.5	10	5	10.9
Des Moines, Ia.	11.4	9.9	7.5	4	*8.3
Davenport, Ia.	11.6	10.1	9.6	4	*10.5
Mason City, Ia.	11.8	10.3	9.8	4	*10.7
St. Louis, Mo.	11.2	9.7	7.5	*4	8
Kansas City, Mo.	10.9	9.4	8.9	*4	9.8
St. Joseph, Mo.	10.9	9.4	8.9	*4	9.8
Fargo, N. D.	13.2	11.7	11.2	4	12.1
Minot, N. D.	14.5	13	12.5	4	13.4
Huron, S. D.	12.5	11	10.5	5	11.4
Wichita, Kans.	10.4	7.6	6.5	4	8.3

*Taxes: in the tax column is included these city and state gasoline taxes at following points: Kansas City, St. Joseph and St. Louis, 1c city tax. Indiana has 4c, and Iowa has 3c kerosine tax per gal., not included in above prices.

Discount to commercial consumers: Effective Jan. 1, 1935, thru territory, except Michigan effective Feb. 1, on purchases per month, discount off t.w. prices; all gasolines, 25 to 1,000 gals., at t.w. price; 1,000 gals., or more, 1.5c off t.w. on Ethyl and Red Crown, and 1c on Stanolind (latter effective June 9, 1937). Minimum delivery is 25 gals.

S. O. Nebraska

Standard Red Crown Gasoline
(*Regular Grade*)

	T.W.	Dealer	Gaso-line Taxes	Kero-sine T.W.
Omaha, Neb.	12	10.5	6	10.8
McCook	11.5	9	6	9.5
Norfolk	12.4	10.9	6	10.3
North Platte	12.8	10.9	6	11
Scottabluff	13.5	10.5	6	12.3

Discounts to commercial consumers: for tank wagon deliveries covered only by Standard Commercial Consumer Contract, effective January 1, 1935.

S. O. Louisiana

Esolene
(*Regular Grade*)

	Consumer Tank Car	Dealer T.W.	Gaso-line Taxes	Kero-sine T.W.
Little Rock, Ark.	7.25	9.75	7.5	11.5
Alexandria, La.	7	9.5	8	*9.5
Baton Rouge, La.	6.5	9	8	*11
New Orleans, La.	6.5	9	*10	*10
Lake Charles, La.	7.5	10	8	*11.5
Shreveport, La.	6	8.5	8	*8.5
Lafayette, La.	7.5	10	8	*11.5
Bristol, Tenn.	9.75	11	8	14.5
Chattanooga, Tenn.	9	11.5	8	13.5
Knoxville, Tenn.	9.5	12	8	14
Memphis, Tenn.	7.5	10	8	12
Nashville, Tenn.	8.5	11	8	10.5

*New Orleans gasoline tax includes 7c state, 1c federal, and 2c parish tax. Louisiana has kerosine tax of 1c per gal.; in addition New Orleans has 1c parish tax, not included in above prices.

Price basis to dealers: Undivided dealers get dealer price, less 0.5c.

Price basis to commercial consumers: Effective May 15, 1937, thru territory; commercial consumers taking 50 gals. or more at one time will be billed at posted consumer t.w. price; those taking less than 50 gals. at one time will be billed at 4c per gal. over posted consumer t.w. price. Generally, the posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Humble Oil & Refining Co.

Humble Motor Fuel
(*Regular Grade*)

	*T.W.	S.S.	Gaso-line Taxes	Kero-sine T.W.
Dallas, Tex.	9	13	5	8
Ft. Worth, Tex.	9	13	5	8
Houston, Tex.	9.5	13.5	5	8
San Antonio, Tex.	8.5	12.5	5	8

U. S. Motor Gasoline
(*Third Grade*)

Dallas, Tex.	7	10	5
Ft. Worth, Tex.	7.5	10	5
Houston, Tex.	8.5	11.5	5
San Antonio, Tex.	7.5	10.5	5

*Price is t.w. price to all classes of dealers and consumers.

Price basis to "open" dealers: discount off posted retail price: when posted retail price, including all taxes on Esso motor fuel is: 19.1c per gal. and above, discount is 3.5c; 19c to 18.1c, 3c, and 18c and below, 2.5c. Humble motor fuel, 17.1c and above, 3.5c; 17 to 16.1c, 3c; and 16c and below, 2.5c; U. S. motor fuel, 15.1c and above, 2.5c; 15 to 14.1c, 2c; and 14c and below, 1.5c.

Continental Oil

Conoco Bronze (*Regular Grade*)
Demand (*Third Grade*)

	—Dealer Prices— Conoco Bronze	De-mand	Gaso-line Taxes	Kero-sine T.W.
Denver, Colo.	9	8	5	11.5
Grand Junc., Colo.	14	13	5	15
Pueblo, Colo.	11.5	10.5	5	10.5
Casper, Wyo.	12	11	5	11.5
Cheyenne, Wyo.	8	7	5	13
Billings, Mont.	13.5	12	6	13
Butte, Mont.	13.5	10.5	6	15.5
Great Falls, Mont.	13.5	12.5	6	15.5
Helena, Mont.	13.5	12.5	6	15.5
Salt Lake City, Utah	13	11.5	5	16
Boise, Ida.	15.5	14.5	6	18
Twin Falls, Ida.	15	14	6	18
Albuquerque, N. M.	11	10	†6.5	12
Roswell, N. M.	11	8.5	†6.5	10.5
Santa Fe, N. M.	12	9.5	*7	12
Muskogee, Okla.	9.5	6.5	5	7
Oklahoma City, Okla.	8.5	6.5	5	8
Tulsa, Okla.	9	6	5	6
Ft. Smith, Ark.	9.25	8.5	5	5
Little Rock, Ark.	9.25	7.625	7.5	8
Texarkana, Ark.	9	6	5	8.5

†Includes city tax of 0.5c.
*Includes 1c city tax.

S. O. California

Standard Gasoline
(*Regular Grade*)

	T.W	S.S.	Gaso-line Taxes	Kero-sine T.W.
San Francisco, Cal.	13.5	14.5	4	11.5
Los Angeles, Cal.	13	14	4	10
Fresno, Cal.	14.5	15.5	4	12.5
Phoenix, Ariz.	15.5	16.5	6	*12.5
Reno, Nev.	15.5	16.5	5	13.5
Portland, Ore.	14	15	6	13.5
Seattle, Wash.	14	15	6	13.5
Spokane, Wash.	17	18	6	16.5
Tacoma, Wash.	14	15	6	13.5

Flight Gasoline
(*Third Grade*)

San Francisco, Cal.	12	13	4	....
Los Angeles, Cal.	11.5	12.5	4	....
Fresno, Cal.	13	14	4	....
Reno, Nev.	14	15	5	....
Phoenix, Ariz.	14	15	6	....
Portland, Ore.	12.5	13.5	6	....
Seattle, Wash.	12.5	13.5	6	....
Spokane, Wash.	15.5	16.5	6	....
Tacoma, Wash.	12.5	13.5	6	....

*Arizona has kerosine tax of 5c per gal., not included in above prices.

Discount to dealers: on gasoline, off t.w. price on Standard Ethyl and Standard Gasoline, to 100% dealers, 3c; to split dealers, 2c; on Flight gasoline, both 100% and split dealers, 2c.

On Stanavo Aviation Gasoline, to all classes of dealers, 3c off t.w.

To commercial consumers: off tank wagon price: on single deliveries of 40 gallons and over. Stanavo Aviation, Standard Ethyl and Standard Gasolines, 3c. Flight Gasoline, 2c per gallon. Tank wagon delivery, less than 40 gals., 1c per gal. above posted t.w. price. Discounts on kerosine: in tank cars, 3c off tank truck price; plant deliveries to jobbers, 2.5c below tank truck price.

Canada

PRICES OF IMPERIAL OIL LTD.

Per Imperial Gallon, which is 1.2 U. S. Gallons

3-Star Imperial Gasoline
(*Regular Grade*)

	T.W.	Gasoline Taxes	Kero-sine T.W.
Hamilton, Ont.	16	6	17
Toronto, Ont.	16	6	17
Brandon, Man.	21.1	7	22.3
Winnipeg, Man.	20.5	7	20.7
Regina, Sask.	20	7	22
Saskatoon, Sask.	22.8	7	24.8
Edmonton, Alta.	19.5	7	21.5
Calgary, Alta.	17	7	19
Vancouver, B. C.	16	7	23
Montreal, Que.	15	6	17.5
St. John, N. B.	14.5	10	18.5
Halifax, N. S.	14.5	10	18.5

Discounts to undivided dealers, 1c off t.w. price, except Maritime Provinces where undivided dealers pay t.w. price. Divided dealers pay t.w. price, thru territory.

Aviation Gasoline

Following are tank car, tank wagon or dealer prices, as indicated, of aviation gasoline in several marketing territories.

S. O. OHIO
Thru Ohio
Stanavo Ethyl Aviation

	Consumer T.W.	Gasoline Taxes
73 octane	15.5	5
80 octane	16.5	5
87 octane	17.5	5

Discounts: For delivery on contract to hangar operators and resellers: 2c below consumer posted t.w. price, shown above.

S. O. INDIANA
Stanavo Ethyl Aviation Gasoline, 73 Octane Number

Chicago, Ill.	14.9
Detroit, Mich.	16.5
Milwaukee, Wis.	15.1
Minneapolis, Minn.	15.3
St. Louis, Mo.	14.5
Kansas City, Mo.	14.2
Fargo, N. D.	16.5
Huron, S. D.	15.8

*Includes 1c city tax.

HUMBLE OIL & REFINING CO.
Stanavo Aviation Gasoline

	Tank Car
Baytown, Tex.	8.5

CONTINENTAL OIL CO.
Conoco Special Gasoline

	Dealer	Gasoline Taxes
Denver, Colo.	14.5	5
Cheyenne, Wyo.	15	5
Helena, Mont.	16.5	6
Salt Lake City, Utah	17.5	5
Albuquerque, N. M.	14	*6.5

*Includes city tax of 0.5c.

S. O. CALIFORNIA
Stanavo Aviation Gasoline

	T.W.	
Phoenix, Ariz.	17.5	6
Los Angeles, Cal.	15	4
San Francisco, Cal.	15.5	4
Reno, Nev.	17.5	5
Portland, Ore.	16	6
Seattle, Wash.	16	6
Spokane, Wash.	19	6

Note: For discounts, etc., see note under Standard and Flight gasoline above.

Naphtha (In Tank Wagon)

S. O. NEW JERSEY
Posted Tank Wagon Prices

	Mineral Spirits	V.M.&P.
Newark, N. J.	11.5	15.5
Baltimore, Md.	15.5	....
Washington, D. C.	15	....

Discounts: Buyers taking following quantities, at one time, get these discounts: Newark, 2c per gal. on 200 gals. or more; less than 200 gals., 0.5c higher price. Baltimore 2c off on 25 to 100 gals. and 3c on over 100 gals. Washington, 2c off to contract buyers.

SOCONY-VACUUM OIL CO.

Buffalo, N. Y.	13	14
New York City	9.5	11.5
Rochester, N. Y.	13	15
Syracuse, N. Y.	14	15
Boston, Mass.	13.5	14
Bridgeport, Conn.	12.5	14
Hartford, Conn.	12	13.5
Providence, R. I.	13.5	14.5

ATLANTIC REFINING CO.

Philadelphia, Pa.	11.5	12.5
Lancaster, Pa.	13	14
Pittsburgh, Pa.	12.5	14.5

Note: Prices for Mineral Spirits also apply to Stoddard Solvent; and prices for V.M.&P. Naphtha apply also to Light Cleaners Naphtha.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline **do not include taxes;** *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect May 30, 1938, as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. OHIO

	S.R. Solvent	V.M.&P. Naphtha
Thru Ohio	12.5	13.5

Note: V.M.&P. Naphtha prices also apply on Dry Cleaners naphtha and special Varnolene; Varnolene and Sohio Solvent 0.5c below these prices. Discounts to contract consumers, eff t.w. price: 300 to 999 gals., 0.5c; 1,000 to 2,499 gals., 0.75c; 2,500 to 4,999 gals., 1c; 5,000 or more gals., 1.5c.

S. O. INDIANA

(Prices include state and federal taxes)

	Oleum Spirits	V.M.&P. Naphtha	Stanisol
Chicago, Ill	16.2	16.5	15.9
Detroit, Mich	19.2	18.7	19.7
Kansas City, Mo	13.9	14.9	14.4
St. Louis, Mo	14.2	15.2	13.9
Milwaukee, Wis	18.8	19.8	19.3
Minneapolis, Minn	19	20	17.7

Note: All prices, with exception of Missouri points, include state tax. Prices shown are base prices, before discounts.

Naphtha (In Tank Cars)

In Tank Cars (F. o. b. refinery or seaboard terminal except Ohio, delivered price.)

	V.M.&P. Naphtha	Solvent
Baltimore	10.5	9.5
New York Harbor	10	9
Philadelphia district	10.5	9
Boston	10.5	9.5
Providence	10.5	9.5
Ohio points, delivered	8.875	*8

*This is on rubber solvent.

Note: In Ohio, prices on D.C. naphtha and special Varnolene are same as V.M.&P.; on Varnolene and Sohio Solvent, prices are 0.5c less than on V.M.&P.

Latest Changes

From May 24 to May 30 inclusive. Dates and amounts of changes shown. See table for full current prices.

S. O. Ohio—Motor gasolines:

Erie county Q.D.A. revised to: 0 to 999 gals. per month, 1.5c per gal. below consumer t. w. price, May 28.

Continental Oil—Conoco Bronze and Demand:

Up 3.5c, Pueblo, May 24.

Corrections

Notation of amount of change and dates not previously shown in table. Table in this issue is corrected to show these changes.

S. O. Indiana—Red Crown:

Wichita dlr. cut 0.4c, May 16.

Stanolind:

Indianapolis dlr. cut 0.7c, May 21.
Wichita dlr. cut 0.9c, May 16.

Kerosine:

Cut 1c, Detroit, May 20.

Continental Oil—Kerosine:

Fort Smith cut 0.5c, May 21.
Little Rock cut 1.5c, May 21.

Eastern

(Continued from page 12)

market, except the possibility of increased transportation costs. Some suppliers had expressed concern early in the week over the possibility of the strike resulting in a shortage of gasoline for jobbers who purchase in barge lots. This was overcome, however, when barge men went back to work May 25.

Price shading continued to be reported in some eastern markets, particularly Philadelphia. Unconfirmed reports were that high octane gasoline was offered at 6.125 cents in that market.

Consumption throughout the east was about on par with 1937 volume, according to reports of distributors.

Wax

NEW YORK, May 31. — Foreign and domestic wax markets for both crude and refined grades remained in the doldrums. Nothing transpired the last week of May to alter the market position which this product has occupied for several weeks.

While occasional low priced offers-to-buy were encountered, they received little consideration, according to reports of sellers. With sellers refusing to consider lower prices, the offers-to-buy have diminished, it was said.

Cabin Camp Guide

HAVERHILL, Mass.—The 1938 edition of "Cabin Trails," a guide to cabin camps in New England and along the Atlantic seaboard into Florida, has been issued by the publisher, Ray A. Walker, of Haverhill, Mass.

Baron-Huot Men Go To Akron

KANKAKEE, Ill.—Eight salesmen and two division managers of the Baron-Huot Oil Co., of Kankakee, Ill., will go to Akron for a trip through rubber plants as reward for going over their quotas in the spring motor oil sales contest just completed.

Builds Refinery Tankage

CHICAGO, May 31.—Sinclair Refining Co. has awarded contracts to Koppers Co. for construction, at its East Chicago refinery, of a water-sealed gas holder with 750,000 cubic feet capacity, a sweating tank, three open-top run-down tanks, and two hot water tanks. Tanks will be welded.

Chicago Oil Heat Assn. Plans Golf Party

CHICAGO, May 31.—The annual golf party of the Burning Oil Distributors Assn. will be held June 28 at Medinah Country Club.

Golf may be played during the morning, and the tournament begins at 1 p. m. on No. 1 course. The swimming pool will be open also.

There will be prizes for golf winners and a dinner in the evening.

Florida 'Gas' Tax Receipts Up

TALLAHASSEE, Fla.—Gasoline tax collections by the state of Florida in April amounted to $1,999,441.78, compared with $1,884,703.62 in April last year, state comptroller reports. Florida tax is seven cents a gallon.

Pennsylvania Refinery Lubricating Oil Inventory

(Issued by National Petroleum Association)

	May 12 Gallons	May 19 Gallons
1. **Raw Long Residuum** (Including all raw long residuum below, and not salable, as 600 fire)	3,050,215	2,969,584
2. **600 Steam Refined** (Includes all steam refined stock commonly sold or used as 600 and as raw material for bright stocks)	7,006,480	7,208,425
3. **Other Steam Refined** (Not included in 1 and 2 above)	5,655,138	5,391,751
4. **Finished Dewaxed Long Res.**	2,453,188	2,816,329
5. **Bright Stock** (Does not include any material reported in 4, above)	23,766,567	23,794,261
6. **Viscous Neutral,** below 180 vis. but not below 142 vis. @ 100	9,235,224	9,893,659
7. **Viscous Neutral,** 180 vis. @ 100 and above	10,099,172	9,761,847

SEABOARD MARKETS, EXPORT AND COASTWISE

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). In cargo markets, spot shipment is 90 days. Prices in cents per gallon, except heavy fuel oil in dollars per barrel, in tank car lots, f.o.b. refineries or seaboard terminals in districts designated, unless otherwise noted. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M.D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Eastern Domestic

(Inter-refinery and export prices not included.)

MOTOR GASOLINE

Prices Effective	May 31	
District:	(a)60-64 Oct.	(a)65 Oct. & Above
N. Y. harbor	6.25 – 6.50	6.50 – 6.75
(b)N.Y.harbor	6.00 – 6.25	6.25 – 6.50
Philadelphia	6.25 – 6.50	6.50 – 6.75
Baltimore	6.25 – 6.50	6.50 – 6.75
Norfolk	6.75 – 7.00	7.00 – 7.25
Wilmington, N.C.	6.75 – 7.00	7.00 – 7.25
Charleston, S.C.	6.75 – 7.00	7.00 – 7.25
Savannah	7.00 – 7.25	7.25 – 7.50
Jacksonville	7.00 – 7.25	7.25 – 7.50
Portland	7.00 – 7.50	7.25 – 7.75
Boston	6.125– 7.00	6.25 – 7.00
Providence	6.50 – 7.25	6.75 – 7.50

WATER WHITE KEROSINE

District:			
N. Y. harbor	5.125–5.50	Charleston	5.75
(b)N. Y. harbor	5.00 – 5.125	Savannah	5.75
Philadelphia	5.25 – 5.50	Jacksonville	5.75
Baltimore	5.25 – 5.50	Portland	5.85
Norfolk	5.50	Boston	5.25– 5.50
Wilmington, N.C.	5.75	Providence	5.25– 5.50

(c)FUEL OILS

	N. Y. harb.	N. Y. harb. barges
No. 1	5.125– 5.50	5.00 – 5.125
Nos. 2-3	4.25 – 4.50	4.00 – 4.25
No. 4	4.00 – 4.50	3.75 – 4.25
No. 5	$1.25	.....
No. 6	$1.05	.....
	Phila. dist.	**Balt. dist.**
No. 1	5.25 – 5.50	5.25 – 5.50
Nos. 2-3	4.25 – 4.50	4.25 – 4.50
No. 4	4.25 – 4.50	4.25 – 4.50
No. 5	$1.25	$1.25
No. 6	$1.05	$1.05
	Bost. dist.	**Prov. dist.**
No. 1	5.25 – 5.50	5.25 – 5.50
Nos. 2-3	4.25 – 4.50	4.25 – 4.50
No. 4	4.25 – 4.50	4.25 – 4.50
No. 5	$1.35	$1.30
No. 6	$1.05	$1.05

District:	(d)Bunker C Fuel	(d) Diesel Oil
N. Y. harbor	(f)$1.05	(g)$1.75
Philadelphia	(f)$1.05	(g)$1.75
Baltimore	(f)$1.05	(g)$1.75
Norfolk	(e)$1.05	$1.75
Charleston	$1.00	$1.85
Savannah	(e)$1.00	$1.995
Jacksonville	(e)$1.00	$1.995
Tampa	(e)$0.95	$1.995
Portland	$1.15	$1.95
Boston	(f)$1.05	(g)$1.75
Providence	$1.05	$1.75–$1.85

	Gas Oil 28-34 Gravity	Diesel Oil Shore Plants
N. Y. harbor	4.25	4.25
Philadelphia dist.	4.50	....
Baltimore dist.	4.25	....
Norfolk dist.	4.75	....
Savannah dist.	....	5.00
Jacksonville dist.	....	5.00

Pacific Export

(i) (Quotations are at seaboard, Los Angeles, in cargo lots, cents per gal., except where otherwise noted.)

Prices Effective	May 31	May 23
U. S. Motor, under 65 oct.	4.675– 4.75	4.625– 4.75
400 e.p. blend, under 65 oct.	4.75 – 4.875	4.75 – 4.875
400 e.p. blend 65 oct. & above	5.00 – 5.25	5.00 – 5.25
(h) 38-40 w.w. kerosine	4.25 – 4.75	4.25 – 4.75
41-43 w.w kerosine	4.75 – 5.00	4.75 – 5.00
44 w.w. kerosine	5.25 – 5.50	5.25 – 5.50
In Cargo lots, per bbl.		
Diesel fuel, 24° & above	$1.15–$1.25	$1.15 –$1.25
Diesel fuel, under 24°	$1.10 –$1.20	$1.10 –$1.20
(h)30-34 diesel (gas oil)	$1.25 –$1.30	$1.25 –$1.30
(k) Grade C fuel oil	$0.60 –$0.70	$0.60 –$0.70

Prices Effective	May 31	May 23
In Ships' Bunkers, or deep tank lots, per bbl.:		
(j)Diesel fuel oil	$1.525–$1.55	$1.525–$1.55
(k)Grade C fuel oil	$0.875–$0.90	$0.875–$0.90
Cased Goods: (Per case		
U. S. Motor	$1.40 –$1.525	$1.40 –$1.525
400 e.p. blend, under 65 octane	$1.50 –$1.60	$1.50 –$1.60
400 e.p. blend, 65 oct. & above	$1.60 –$1.70	$1.60 –$1.70
(h)40-43 w.w. kerosine	$1.30 –$1.40	$1.30 –$1.40
Kerosine, p.w.	$1.25 –$1.35	$1.25 –$1.35

New York Export

(Cents per gal. in bbls. F.a.s. New York)

CYLINDER OILS (Pennsylvania Products)

Bright stock:		
Light, 25 p.t.	19.50 –20.00	20.50 –21.00
Neutral oil:		
200 3 color, 25 p.t.	20.50	22.50
150 3 color, 25 p.t.	19.00	20.50
600 s.r., unfiltered	16.00	15.00 –15.50
650 s.r., unfiltered	18.00	17.00 –17.50
600 fl., s.r.	18.50	17.50 –18.00
630 fl., s.r.	21.50	21.00 –21.50

Wax, Domestic *and* Export

(A.S.T.M. Tests. Melting points, however, are A.M.P., 3° higher than E.M.P. Export prices, f.a.s., carloads. Domestic prices, f.o.b. refineries in New Orleans & New York districts in bags, carloads, with 0.2c discount allowed for shipment in bulk, except where noted below. Scale solid; fully refined, slabs in bags)

Prices Effective	May 31	
	New York	
	Domestic	Export
124-6 Y.C. scale	1.95 – 2.20	1.95 – 2.20
122-4 W.C. scale	1.95 – 2.20	1.95 – 2.20
124-6 W.C. scale	1.95 – 2.20	1.95 – 2.20
123-5 Fully rfd.	4.30	3.50
125-7 Fully rfd.	4.35	3.50 – 3.625
128-30 Fully rfd.	4.45	3.75 – 3.875
130-2 Fully rfd.	4.55	4.125
133-5 Fully rfd.	(l)5.00	4.50 – 4.625
135-7 Fully rfd.	(l)5.25	5.00 – 5.125
	New Orleans	
	Domestic	Export
124-6 Y.C. scale	1.95 – 2.20	1.95 – 2.20
122-4 W.C. scale	1.95 – 2.20	1.95 – 2.20
124-6 W.C. scale	1.95 – 2.20	1.95 – 2.20
123-5 Fully rfd.	4.30	3.50
125-7 Fully rfd.	4.35	3.50 – 3.625
128-30 Fully rfd.	4.45	3.75 – 3.875
130-2 Fully rfd.	4.55	4.125
133-5 Fully rfd.	(l)5.00	4.50 – 4.625

Gulf Coast

(F.o.b. ship, Gulf oil terminals; minimum 20,000 bbls.; representing traders' opinions)

Prices Effective	May 31	May 23
For Domestic shipment:		
MOTOR GASOLINE		
59 oct. & below	5.00 – 5.125	5.00 – 5.125
60-64 oct.	5.125– 5.25	5.125– 5.25
65-67 octane	5.25 – 5.375	5.25 – 5.375
68-70 octane	5.50 – 5.625	5.50 – 5.625
FUEL OILS		
No. 1	3.875– 4.125	4.00 – 4.25
No. 2	3.25	3.25
KEROSINE		
41-43 w w	3.875– 4.125	4.00 – 4.25
For Export Shipment:		
GASOLINE		
U. S. Motor	4.75 – 4.875	4.75 – 4.875
60-62, 400 e.p.	4.75 – 4.875	4.75 – 4.875
61-63, 390 e.p.	4.875– 5.00	4.875– 5.00
64-66, 375 e.p.	4.875– 5.00	4.875– 5.00
KEROSINE		
44 w.w.	(a) 4.375–4.625	4.625– 4.875
41-43 w.w.	3.875– 4.125	4.00 – 4.25
41-43 p.w.	3.875– 4.125	4.00 – 4.25

Prices Effective	May 31	May 23
GAS AND BUNKER OILS		
For Export Shipment		
Gas Oil (m):		
Below 43 diesel index	3.25	3.25
43-47 diesel index	3.25 – 3.50	3.25 – 3.50
48-52 diesel index	(a)3.50	(a)3.50
53-57 diesel index	(a)3.625	(a)3.625
For Domestic and /or Export Shipment		
Diesel Oil Ship's bkrs.	(o)$1.55–$1.75	(o) $1.55–$1.75
Grade C bunker oil for ship's bunkers	(o)$0.80	(o)$0.80
Grade C bunker oil, in cargoes	$0.70 –$0.75	$0.70 –$0.75

MID-CONTINENT LUBRICATING OILS

(Cents per gal at Gulf; in bbls., f.a.s.; in bulk, f.o.b. terminals)

	May 31	
190-200 vis. D. 210 brt.	(p) Barrels	Bulk
stock	23.50 –24.50	18.00 –20.50
150-160 vis. D 210 brt. stock:		
0-10 p.p.	19.50 –20.50	14.50 –15.00
10-25 p.p.	19.00 –20.00	14.00 –14.50
150-160 vis. E 210 brt. stock	19.00 –20.00	14.00 –14.50
120 vis. D 210 brt. stock:	19.00 –20.00	14.00 –14.50

	May 31	May 23
180 vis. No. 3 color neutral:	Bulk	Bulk
0-10 p.p.	8.25 –10.00	8.25 –10.00
15-30 p.p.	8.00 – 9.25	8.00 – 9.25
200 vis. No. 3 color neutral:		
0-10 p.p.	8.75 –10.50	8.75 –10.50
15-30 p.p.	8.50 –10.25	8.50 –10.25
600 s.r. olive green	9.00 –11.25	9.00 –11.25
600 s.r. dark green	7.00 – 9.25	7.00 – 9.25

SOUTH TEXAS LUBRICATING OILS

(Vis. at 100° cold test 0, bulk export shipment, f.o.b. terminals.)

Unfiltered Pale Oils:		
Vis. Color		
100 No. 3	4.75 – 5.00	4.75 – 5.25
200 No. 3	6.25 – 6.75	6.50 – 7.00
300 No. 3	6.75 – 7.25	7.00 – 7.50
500 No. 3½	7.75 – 8.25	8.00 – 8.50
750 No. 4	8.25 – 8.75	8.50 – 9.00
1200 No. 4	8.75 – 9.25	9.00 – 9.50
2000 No. 4	9.00 – 9.50	9.25 – 9.75
Red Oils:		
Vis. Color		
100 No. 5-6	4.75 – 5.00	4.75 – 5.25
200 No. 5-6	6.25 – 6.75	6.50 – 7.00
300 No. 5-6	6.75 – 7.25	7.00 – 7.50
500 No. 5-6	7.75 – 8.25	8.00 – 8.50
750 No. 5-6	8.25 – 8.75	8.50 – 9.00
1200 No. 5-6	8.75 – 9.25	9.00 – 9.50
2000 No. 5-6	9.00 – 9.50	9.25 – 9.75

Note: Red oil prices cover oils with green cast; prices for blue cast red oils are slightly lower in some cases.

Tanker Rates

(Approximate freight rates to Continental ports, shillings per ton of 2240 lbs., British sterling; to U. S. ports cents per bbl.)

Rates Effective May 31

	Crude &/or Fuel		Refined Oil &/or Spirits	
	Last Paid	Owners Ask	Last Paid	Owners Ask
Gulf-U.K./Cont.(q)	12/9	13/-15/	13/6	13/-15/
Aruba-U.K./Cont.(q)	11/	11/-13/	10/6	11/-13/
Gulf-N. Atlantic (r) (not E.of N.Y.): Hvy. Crude & fuel, (10 to 19.9 gravity)	15.5c	16c	....	....
Light Crude, (30 Grav. or Lighter)	14c	14c	....	....
Gasoline	....	....	15c	15c
Kerosine	....	....	15c	15c
Light Fuel	....	....	15c	15c

(a) Prices nominal. (b) In barge lots. (c) Fuel oils meet specifications of U. S. Commercial Standards CS12-35. (d) In ships' bunkers. (e) For barging, add 5c per bbl. (f) For barging, add 5 to 6c per bbl. (g) For barging, add 6.5 to 7.5c per bbl. (h) 150 fire point. (i) For San Francisco cargo prices, add 5c per bbl. to cargo prices shown above. (j) Pacific Specification 200. (k) Pacific Specification 400. (l) Shipment either in bags or in bulk. (m) Less than ½ of 1% sulfur. (n) No prices reported. (o) Barging 5c per bbl. additional at some Gulf ports. (p) Second-hand barrels. (q) Continental ports in range between Bordeaux and Hamburg, both inclusive. (r) Venezuela loading, same rate; Tampico, 2c to 3c per bbl. additional.

CRUDE OIL MARKETS

Prices in $ per bbl. of 42 U. S. gals. at the well. A. P. I gravity. Prices are effective as of 7 a. m. of dates as given

EASTERN FIELDS

Posted by Joseph Seep Purchasing Agency

(Effective March 7, 1938, except Corning Sept. 2, 1937)

Penna. Grade Oil in Southwest Penna. Pipe Lines.....$1.71
Penna. Grade Oil in Eureka Pipe Lines (West Virginia).....$1.65
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O.).....$1.55
Corning Oil in Buckeye Pipe Lines (Ohio)...$1.27

Posted by Other Companies

Tide Water Associated Oil Co.
Bradford-Allegany district (Penna. and N. Y.) (Effective March 7, 1938).....$2.05
*The Pennzoil Co.: (Effective March 7, 1938)
Penna. Grade Oil in National Transit Lines*$1.98
Ashland Oil & Transportation Co.:
Somerset Oil in Ashland Lines (Ky.):
(Effective Jan. 28, 1937)
Big Sandy River.....$1.42
Kentucky River.....$1.50

*The Pennzoil Co. posts $1.98 in Cochran, Franklin, Hamilton and Doolittle, Pa. fields; prices in other lower districts range down to $1.93 per bbl. at well.

MICHIGAN

Posted by Pure Oil Co.

Midland, Midland County (Jan. 5, 1938)....$1.12

Posted by Simrall Pipe Line Corp.

(Effective Dec. 29, 1937)

West Branch, Arenac, and equal grades.....$0.80

(Effective Jan. 8, 1938)

Beaverton, Crystal, Greendale, Porter and equal grades.....$1.12
Buckeye, Bentley, Billings, Tobacco and equal grades.....$1.095

CENTRAL STATES FIELDS

Posted by Ohio Oil Co

(Effective Jan. 28. 1937)

Illinois, Princeton.....$1.35
Owensboro (Western Ky.).....$1.40

(Effective Nov. 20, 1937)

Lima, O.....$1.00

Posted by Owensboro Corp.

(Effective May 25, 1938)

Centralia, Ill.....$1.25

Posted by Stoll Oil Refining Co.

(Effective Feb. 1, 1937)

Stoll Pipe Line Oil (Ky.).....$1.40

CANADIAN FIELDS

Posted by Imperial Oil Limited

Western Ontario

(Effective Sept. 9, 1933)

Petrolia.....$2.10
Oil Springs.....$2.17

Alberta—Turner Valley

(Prices f.o.b. field tankage)

(Effective Jan. 5, 1938)

Crude Oil

40 40.9*	$1.14	53-53.9	$1.40
41-41.9	1.16	54-54.9	1.42
42-42.9	1.18	55-55.9	1.44
43-43.9	1.20	56-56.9	1.46
44-44.9	1.22	57-57.9	1.48
45-45.9	1.24	58-58.9	1.50
46-46.9	1.26	59-59.9	1.52
47-47.9	1.28	60-60.9	1.54
48-48.9	1.30	61-61.9	1.56
49-49.9	1.32	62-62.9	1.58
50-50.9	1.34	63-63.9	1.60
51-51.9	1.36	64-64.9	1.62
52-52.9	1.38		

Crude Naphtha, 65 grav. & above.....$2.14

Absorption Gasoline

90% Rec., 20 lb. Reid v.p.....$1.94
90% Rec., 17 lb. Reid v.p.....$2.08

MID-CONTINENT

Posted by Stanolind Crude Oil Purchasing Co., Jan. 28, 1937

	(In Oklahoma-Kansas)*	(In North-North Central Texas)
Below 29	$1.06	$0.96
29-29.9	1.08	0.98
30-30.9	1.10	1.00
31-31.9	1.12	1.02
32-32.9	1.14	1.04
33-33.9	1.15	1.06
34-34.9	1.18	1.08
35-35.9	1.20	1.10
36-36.9	1.22	1.12
37-37.9	1.24	1.14
38-38.9	1.26	1.16
39-39.9	1.28	1.18
40 & above	1.30	1.20

Above Stanolind prices met as follows:

Jan. 28, Continental Oil Co. met in Okla., Kans., and North Texas. Sinclair-Prairie met in North Texas and North Central Texas, Jan. 28, Stanolind's North Texas schedule. Same date, The Texas Co. met in North-North Central Texas

Effective May 10, 1938, Kanotex Refg. Co. posted Okla.-Kans. crude, 34 & below, at $0.93, 35-35.9 at $0.95, plus 2c differential to 40 & above, at $1.05.

Note: Stanolind prices in Okla.-Kans. are for quantities computed by 97% tank tables. In Texas, 100% tank tables are used effective Oct. 1, 1937, volume corrected to 60° F., and deduction for full b.s. & w. content.

*Effective Aug. 1, 1937, for Otis-Albert pools Rush-Barton counties, Kans., 13c less.

Posted by Carter Oil Co.

In Oklahoma

(Effective Jan. 28, 1937)

Below 25	$0.98	33-33.9	$1.16
25-25.9	1.00	34-34.9	1.18
26-26.9	1.02	35-35.9	1.20
27-27.9	1.04	36-36.9	1.22
28-28.9	1.06	37-37.9	1.24
29-29.9	1.08	38-38.9	1.26
30-30.9	1.10	39-39.9	1.28
31-31.9	1.12	40 and above	1.30
32-32.9	1.14		

Above Carter schedule met Jan. 28 by the following companies: Sinclair-Prairie, Shell and Bransdall in Oklahoma-Kansas; Skelly Oil in Kansas; Tide Water in Oklahoma; Pure Oil in Oklahoma-Kansas, beginning with below 24 at $0.98 and ending with 40 & above at $1.30.

Posted by Magnolia Petroleum Co.

(Effective Jan. 28, 1937)

In Oklahoma, same schedule as Carter Oil, which see above, beginning with below 25, at $0.98 and ending with 40 & above, at $1.30.

In Texas: North and North Central, including Burkburnett, Archer, Henrietta, Electra, Comanche and Olden, same gravity and price schedule as Stanolind in North Texas, which see under Stanolind, beginning with below 29 at $0.96 and ending with 40 and above, at $1.20.

	Jefferson County, Texas Beaumont (Magnolia) (Oct. 1, 1937)	West Beaumont (Humble) (May 1, 1938)
Below 21°	$0.95	$0.95
21-21.9	0.98	0.98
22-22.9	1.01	1.01
23-23.9	1.04	1.04
24-24.9	1.07	1.07
25-25.9	1.10	1.10
26-26.9	1.13	1.13
27-27.9	1.15	1.15
28-28.9	1.17	1.17
29-29.9	1.19	1.19
30-30.9	1.21	1.21
31-31.9	1.23	1.23
32-32.9	1.25	1.25
33-33.9	1.27	1.27
34-34.9	1.29	1.29
35-35.9	for	1.31
36-36.9	oil	1.33
37-37.9	34 & above	1.35
38-38.9		1.37
39-39.9		1.39
40 & above		1.41

TEXAS FIELDS

Posted by Humble Oil & Refining Co.

(*West Central Texas)

(Effective Jan. 28, 1937)

Below 29	$0.96	35-35.9	$1.10
29-29.9	0.98	36-36.9	1.12
30-30.9	1.00	37-37.9	1.14
31-31.9	1.02	38-38.9	1.16
32-32.9	1.04	39-39.9	1.18
33-33.9	1.06	40 and above	1.20
34-34.9	1.08		

*Includes Brown, Callahan, Coleman, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, Throckmorton and Young counties.

Shell Petroleum Corp., effective Jan. 28, posts Humble's above schedule on Fisher county crude, plus these five lower grades, beginning with below 25 gravity at $0.88; 25-25.9, $0.90; 26-26.9, $0.92; 27-27.9, $0.94, and 28-28.9, $0.96; rest of schedule same as Humble's in West Central Texas.

Note: Effective Oct. 1, 1937, Humble prices are based on 100% tank tables at 60F.

*East Central Texas

(Effective Jan. 28, 1937)

Below 29	$1.03	35-35.9	$1.17
29-29.9	1.05	36-36.9	1.19
30-30.9	1.07	37-37.9	1.21
31-31.9	1.09	38-38.9	1.23
32-32.9	1.11	39-39.9	1.25
33-33.9	1.13	40 and above	1.27
34-34.9	1.15		

*Including Anderson, Cherokee, Limestone, Navarro counties.

Same date, Sinclair-Prairie met in Mexia Humble's above schedule.

PANHANDLE TEXAS

Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

	Gray County	Carson-Hutchinson
Below 35	$0.96	$0.91
35-35.9	0.98	0.93
36-36.9	1.00	0.95
37-37.9	1.02	0.97
38-38.9	1.04	0.99
39-39.9	1.06	1.01
40 & above	1.08	1.03

Jan. 28, above prices met by Sinclair-Prairie and Magnolia in the entire area and by Continental in Carson-Hutchinson and by Texas Co. in Panhandle Sweet, same as Humble's Gray Co. and on Panhandle Sour, same as Carson-Hutchinson.

EAST TEXAS

(Effective May 22, 1937)

Stanolind, Humble, Shell, Sinclair-Prairie, Texas Co., and Magnolia.....$1.35

Shell also posted on Jan. 28, in Livingston area, Polk County, Texas. $1.27

NORTHEAST TEXAS

(Posted by Humble, Jan. 28, 1937)

Talco.....$0.73

(Posted by Magnolia, Jan. 28, 1937)

Cass County and Panola County, Tex.:

Same gravity and price schedule as S. O. Louisiana posts for Rodessa, La., which see under that company.

(Posted by The Texas Co., Jan. 28, 1937)

Cass County.....$1.25

WEST TEXAS AND NEW MEXICO

Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

(Including Andrews, Crane, Crockett, Ector, Glasscock, Howard, Winkler and Upton Counties, Texas and Lea county, New Mexico).

Below 26	$0.78	33-33.9	$0.94
26-26.9	0.80	34-34.9	0.96
27-27.9	0.82	35-35.9	0.98
28-28.9	0.84	36-36.9	1.00
29-29.9	0.86	37-37.9	1.02
30-30.9	0.88	38-38.9	1.04
31-31.9	0.90	39-39.9	1.06
32-32.9	0.92	40 & above	1.08

Pecos, West Texas.....$0.91

Jan. 28, Magnolia met Humble in Crane, Upton, Howard, Glasscock, Mitchell and Winkler.

Shell Petroleum Corp., on Jan. 28, met Humble in Crane, Glasscock, Howard, Pecos (except Yates shallow pool), Winkler, and Upton counties, Tex., and in Lea County, N. Mex. On Jan. 28, Shell posted in Yates shallow pool in Pecos county, Tex., $0.81. June 4, 1937, Shell added Ector county to West Texas postings.

Jan. 28, Stanolind Oil & Gas Co. met Humble in Hendrick field, Winkler county.

Jan. 28, Texas Co. met Humble in Ward and Winkler counties, Tex., and Lea County, N. M. except that its top grade is 36 and above, at $1.00.

April 20, 1937, Sinclair Prairie met Humble in Ward and Winkler, Tex. and Lea, N. M., counties, except that its gravity schedule ends with 36 and above, at $1.00.

Posted by Continental Oil Co.

(Effective Jan. 28, 1937)

Artesia, Jackson and Maljamar pools, N. M...$0.90

COLORADO

(Posted by Continental Oil Co., Effective Jan. 28, 1937)

Ft. Collins and Wellington

Below 29	$1.01	35-35.9	$1.15
29-29.9	1.03	36-36.9	1.17
30-30.9	1.05	37-37.9	1.19
31-31.9	1.07	38-38.9	1.21
32-32.9	1.09	39-39.9	1.23
33-33.9	1.11	40 & above	1.25
34-34.9	1.13		

Cannon City and Florence, Col.....$1.10

SOUTH AND SOUTHWEST TEXAS

All Shown Below Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

Carroll, Clark, Darst Creek, Hilbig, Salt Flat and Zoboroski fields.....$1.09
Pettus.....$1.37 Van Zandt.....$1.10

Jan. 28, Magnolia met Humble in Darst Creek; posted $1.00 in Luling; $1.12 in Lytton Springs; $1.27 for Cleveland, and $1.15 in Hardin, both in Liberty county, Tex.

Jan. 28, 1937, The Texas Co. met Humble in Darst Creek.

Anahuac, Dickinson, Fleur Bluff and Turtlebay

(Effective Jan. 28, 1937)

Below 31	$1.16	36-36.9	$1.28
31-31.9	1.18	37-37.9	1.30
32-32.9	1.20	38-38.9	1.32
33-33.9	1.22	39-39.9	1.34
34-34.9	1.24	40 and above	1.36
35-35.9	1.26		

Conroe, Raccoon Bend (Deep sand crude) Tomball and Satsuma

(Effective Jan. 28, 1937)

Below 29	$1.20	35-35.9	$1.34
29-29.9	1.22	36-36.9	1.36
30-30.9	1.24	37-37.9	1.38
31-31.9	1.26	38-38.9	1.40
32-32.9	1.28	39-39.9	1.42
33-33.9	1.30	40 & above	1.44
34-34.9	1.32		

Jan. 28, Magnolia met Humble in Tomball and Texas Co. met Humble in Conroe, beginning with 35-35.9 gravity.

Jefferson County, Tex.

West Beaumont, see prices under Magnolia in center column.

(Continued on next page)

CRUDE OIL MARKETS

(*Continued from preceding page*)

South-Southwest Texas (cont'd)

Posted by Humble

***Mirando**

(Effective July 6, 1937)

Below 21	$0.96	31-31.9	$1.18
21-21.9	0.98	32-32.9	1.20
22-22.9	1.00	33-33.9	1.22
23-23.9	1.02	34-34.9	1.24
24-24.9	1.04	35-35.9	1.26
25-25.9	1.06	36-36.9	1.28
26-26.9	1.08	37-37.9	1.30
27-27.9	1.10	38-38.9	1.32
28-28.9	1.12	39-39.9	1.34
29-29.9	1.14	40 & above	1.36
30-30.9	1.16		

*Includes Duval, Jim Hogg, Webb and Zapata counties, Tex. and Heyser and Placedo crudes.

July 6, Magnolia posted same schedule as Humble in Mirando.

July 6, 1937, Texas Co. posted for Duval-Mirando, $0.96 for below 21, plus 2c differential, to $1.12 for 28 & above.

LOUISIANA-ARKANSAS

Posted by Standard Oil Co. of Louisiana

	*N. La.-Ark.	Rodessa, La.	So. La. Roanoke N. Crowley
	(Effective Jan. 28, 1937)		(Dec. 28,'37)
Below 21°..	$0.90	$0.93	$0.90
21-21.9....	for	for	.93
22-22.9....	oil	oil	.96
23-23.9....	Below	Below	.99
24-24.9....	25°.	25°.	1.02
25-25.9....	$0.92	$0.95	1.05
26-26.9....	.94	.97	1.08
27-27.9....	.96	.99	1.10
28-28.9....	.98	1.01	1.12
29-29.9....	1.00	1.03	1.14
30-30.9....	1.02	1.05	1.16
31-31.9....	1.04	1.07	1.18
32-32.9....	1.06	1.09	1.20
33-33.9....	1.08	1.11	1.22
34-34.9....	1.10	1.13	1.24
35-35.9....	1.12	1.15	1.26
36-36.9....	1.14	1.17	1.28
37-37.9....	1.16	1.19	1.30
38-38.9....	1.18	1.21	1.32
39-39.9....	1.20	1.23	1.34
40 & above	1.22	1.25	1.36

*Includes Caddo, Homer, Haynesville, Sabine, De Soto, Sarepta, Carterville, El Dorado, Bunkie and Miller county.

Smackover, Ark. $0.90

Urania, La. (Arkansas Fuel Oil Co., Jan. 28, '37) $1.02

Tepetate, La. (Continental Oil, Jan. 28, '37) ... 1.24

Jan. 28, 1937, Magnolia met S. O. La.'s No. La.-Ark. gravity and price schedule in Pine Island, Haynesville, Bull Bayou and Cotton Valley, La., and in Eldorado and Rainbow districts, Ark.; and met S. O. La.'s Rodessa prices; and in Lockport, Iowa, Cameron Meadow, La., posted Humble's gravity and price schedule on Mirando. El Dorado East Field, Ark. price same as Smackover, effective Jan. 28, '37.

Jan. 28, The Texas Co. met S. O. La. in N. La., except that its gravity schedule begins with below 27 at $0.94. It posted $1.37 for Garden Island, La., $1.24 for LaFitte, La. and $0.90 for Smackover.

***GULF COASTAL FIELDS**

Posted by Humble Oil & Refining Co. and The Texas Co.

	Humble	Texas	Saxet (Humble) (July 6 '37)
	(Effective Jan. 28, 1937)		
Below 18.....	$0.95	‡$0.95	....
18-18.9.....	for	for	....
19-19.9.....	below	below	....
20-20.9.....	21°	21°.	$1.01
21-21.9.....	0.98	0.98	1.03
22-22.9.....	1.01	1.01	1.05
23-23.9.....	1.04	1.04	1.07
24-24.9.....	1.07	1.07	1.09
25-25.9.....	1.10	1.10	1.11
26-26.9.....	1.13	1.13	1.13
27-27.9.....	1.15	1.15	1.15
28-28.9.....	1.17	1.17	1.17
29-29.9.....	1.19	1.19	1.19
30-30.9.....	1.21	1.21	1.21
31-31.9.....	1.23	1.23	1.23
32-32.9.....	1.25	1.25	1.25
33-33.9.....	1.27	1.27	1.27
34-34.9.....	1.29	1.29	1.29
35-35.9.....	1.31	for	1.31
36-36.9.....	1.33	oil	1.33
37-37.9.....	1.35	34°	1.35
38-38.9.....	1.37	and	1.37
39-39.9.....	1.39	above.	1.39
40 and above...	1.41	....	1.41

†Refugio

(Effective July 6, 1937)

Posted by Humble

20-20.9	$1.01	23-23.9	$1.07
21-21.9	1.03	24-24.9	1.09
22-22.9	1.05	25-25.9	1.11

Rest of schedule same as Humble's Gulf Coastal crude prices.

†Includes Saxet, Greta, O'Connor-McFadden, Taft, Plymouth and Tom O'Connor crude.

*Humble's prices apply in these Texas fields: Amelia, Barbers Hill, Clinton, Goose Creek, Hull, Liberty, Mykawa, Orange, Pierce Junction, Racoon Bend, (shallow sand), Sugarland, Thompsons, and West Columbia. Same prices also apply, effective Feb. 1, 1938, in Clinton, Tex., posted by Stanolind Crude Oil Purch. Co.

Jan. 28, Sinclair-Prairie met above Humble schedule in full.

‡$0.95 for oil below 21° posted April 1, 1938.

July 6, 1937, The Texas Co. posted for Refugio, which includes Greta, Saxet and Taft: $1.01 for below 21, plus 2c differential, to $1.17 for 28 & above.

Texas Co. postings in Gulf Coastal Texas include: Arriola, Five Corners, Ganado, Humble, Liberty, Magnet, Manvel, Markham, Mauritz, McFaddin, Pickett Ridge, Port Neches, Sour Lake, West Columbia and Withers. In Gulf Coastal Louisiana: Bay St. Elaine, Caillou Island, Dog Lake, Four Isle, Gillis, Horseshoe Bayou, Iberia, Lake Barre, Lake Pelto, Leesville and Port Barre.

ROCKY MOUNTAIN FIELDS

Posted by Stanolind Oil & Gas Co.

(Effective Jan. 28, 1937)

Salt Creek, (except Tensleep crude), Midway and Dutton Creek, Wyo., same schedule as Stanolind posts in Oklahoma, Kansas which see under Mid-Continent crude on previous page.

(Effective Jan. 6, 1938)

Tensleep, Salt Creek field $0.70

(Effective Jan. 28, 1937)

Greybull-Torchlight $1.30
Iles, light, Col. 1.18
Iles, heavy 1.12
Hogback, N. M. 1.33
Big Muddy 1.23
Elk Basin, light 1.30
Grass Creek, light 1.30

(Effective May 1, 1938)

Frannie light 0.65
Grass Creek, heavy $0.50
Hamilton Dome, Wyo. 0.45

(Effective Nov. 4, 1936)

Frannie heavy 0.62

Posted by Ohio Oil Co.

(Effective Jan. 28, 1937)

Elk Basin, Wyo. $1.30
Grass Creek, light 1.30
Rock Creek 1.205
Lance Creek 0.97

(Effective May 1, 1938)

Grass Creek heavy $0.50

(Effective Nov. 16, 1937)

Sunburst, Mont. $0.90

Posted by Continental Oil Co.

(Effective Jan. 1, 1938)

Cat Creek, Mont. $1.30

(Effective Jan. 28, 1937)

Big Muddy, Wyo. 1.18
Lance Creek, Wyo. 0.97

CALIFORNIA, *Posted by Standard Oil of California*

All gravities above those quoted take highest price offered in the field. Prices effective Feb. 26, 1936, except Huntington Beach, Playa del Rey, Santa Fe Springs, Kern Front, Signal Hill (Long Beach) effective March 7, 1936; Elk Hills effective June 22, 1936; Lakeview Area, Aug. 19, 1936; El Segundo and Wilmington, Oct. 15, 1937; Greeley-Canal, Dec. 22, 1937; Santa Maria Valley, by Union Oil, May 20, 1938.

Gravity	Signal Hill (Long Beach) El Segundo †Wilmington	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda Brea Canon	Athens Rosecrans	Dominguez	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	‡Newhall and others	Mountain View	Elk Hills	Buena Vista Hills Midway-Sunset Lakeview Area	Greeley-Canal (Kern County)	Lost Hills	Coalinga	Wheeler Ridge	Santa Maria (Union Oil)
13-13.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	$0.40
14-14.9	$0.80	0.79	0.74	0.78	0.79	0.80	0.76	....	....	0.80	0.76	0.76	0.77	0.78	....	0.70	....	0.70	0.70	....	0.70	0.70	....	.42
15-15.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.44
16-16.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.45
17-17.9	.80	.79	.74	.78	.81	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.46
18-18.9	.80	.79	.74	.78	.84	.80	.78	....	....	.82	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.47
19-19.9	.82	.79	.74	.82	.87	.84	.81	....	....	.85	.76	.78	.77	.78	....	.70	.70	.74	.74	....	.74	.71	.70	.48
20-20.9	.85	.79	.74	.85	.90	.88	.84	....	....	.88	.78	.82	.77	.80	....	....	.70	.78	.78	....	.78	.72	.70	....
21-21.9	.88	.79	.74	.89	.93	.93	.88	....	....	.91	.80	.85	.77	.84	.78	....	.73	.82	.82	....	.82	.74	.70	....
22-22.9	.92	.82	.74	.92	.96	.98	.92	....	....	.93	.84	.89	.79	.88	.78	....	.77	.87	.87	....	.86	.78	.72	....
23-23.9	.95	.86	.77	.96	.99	1.02	.96	.84	.79	.96	.88	.93	.82	.92	.78	....	.80	.92	.92	....	.90	.82	.76	....
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	.99	.91	.96	.85	.96	.82	....	.84	.97	.97	....	.94	.86	.79	....
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	1.02	.95	....	.89	.99	.86	....	.88	1.01	1.01	....	.98	.90	.88	....
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	1.05	.98	....	.92	1.03	.90	....	.91	1.06	1.06	....	1.02	....	....	....
27-27.9	1.10	1.05	.88	1.11	1.12	....	1.10	1.06	.88	....	1.02	....	.96	1.06	.95	....	.95	1.10	1.10	$0.84	1.06	....	....	....
28-28.9	1.14	1.10	.90	1.14	1.15	....	1.14	1.07	.90	....	1.06	....	.99	1.10	.99	....	.99	1.15	1.15	.88	1.10	....	....	....
29-29.9	1.17	1.15	.93	1.18	1.18	....	1.17	1.12	.93	....	1.09	....	1.03	1.14	1.03	....	1.02	1.20	1.20	.92	1.14	....	....	....
30-30.9	1.21	1.19	.95	1.22	1.21	....	1.21	1.17	.95	....	....	....	1.07	1.17	1.08	....	1.06	1.25	1.25	.95	1.18	....	....	....
31-31.9				....	1.24		1.24	1.22	.97	....	....	....	1.11	1.21	1.12	....	1.09	1.29	1.29	.99				....
32-32.9		*Elwood Terrace		....	1.27		1.27	1.27	1.00	....	....	....	1.14	1.25	1.16	....	1.13	1.34	1.34	1.03	Kettleman Hills			....
33-33.9	....	1.28	....	....	....		....	1.32	....	....	....	....	1.18	1.28	1.20	....	1.17	1.38	1.38	1.07	....	1.19	....	....
34-34.9	....	1.32	....	....	....		....	1.37	....	....	....	....	1.22	1.32	1.25	....	1.20	....	....	1.11	....	1.23	....	....
35-35.9	....	1.35	....	....	....		....	1.42	....	....	....	....	1.25	....	1.29	....	....	....	....	1.15	....	1.27	....	....
36-36.9	....	1.39	....	....	....		....	1.46	....	....	....	....	1.29	....	1.33	....	....	....	....	1.19	....	1.31	....	....
37-37.9	....	1.43	....	....	....		....	1.51	....	....	....	....	1.32	....	1.37	....	....	....	....	1.23	....	1.35	....	....
38-38.9	....	....	....	....	....	F. O. B. Standard Pipe Line	....	1.56	....	....	....	....	1.36	....	1.42	....	....	....	....	1.27	....	1.39	....	....
39-39.9	....	....	....	....	....		....	1.61	....	....	....	....	1.40	....	....	....	....	....	....	1.31	....	1.43	....	....
40-40.9	....	....	....	....	....		....	1.66	....	....	....	....	1.43	....	....	....	....	....	....	1.34	....	....	....	....
41-41.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.38	....	....	....	....
42-42.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.41	....	....	....	....
43-43.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.45	....	....	....	....
44-44.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.49	....	....	....	....
45-45.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.53	....	....	....	....
46-46.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.56	....	....	....	....
47-47.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.60	....	....	....	....
48-48.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.64	....	....	....	....

*F. o. b. ship.

‡Also McKittrick, Kern River. Kern Front and Round Mountain $0.70 thru 19.9 gravity; no higher gravity quoted.

†Wilmington prices differ on gravities below 18.9. Prices are: 14-16.9, $0.75; 17-17.9, $0.77; and 18-18.9, $0.79; rest of schedule same as Signal Hill.

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Coming Meetings

Illinois-Indiana Petroleum Assn., Robinson, Ill., June 4.
Oil Workers International Union, Houston, Texas, June 6.
American Society of Mechanical Engineers, national oil and gas power meeting, Dallas, Texas, June 6 to 9.
Society of Automotive Engineers, summer meeting, The Greenbrier, White Sulphur Springs, W. Va., June 12 to 17.
Oil Trades Assn. of New York, sports day, Pelham Country Club, Pelham, N. Y., June 14.
Cincinnati Oil Club, annual picnic, Miami Boat Club, Miamiville, Ohio, June 16.
Pennsylvania Grade Crude Oil Assn., William Penn Hotel, Pittsburgh, Pa., June 16, 17 and 18.
American Society of Mechanical Engineers, St. Louis, Mo., June 20 to 24.
American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 27 to July 1.
Michigan Petroleum Exposition, Island Park, Mt. Pleasant, Mich., July 26 to 31.
West Virginia Oil and Natural Gas Assn., Charleston, W. Va., July 27, 28.
American Chemical Society, Milwaukee, Wis., Sept. 5 to 9.
National Petroleum Assn., 36th annual meeting, Hotel Traymore, Atlantic City, Sept. 14, 15 and 16.
Oil Trades Assn. of New York, sports day, Pelham Country Club, Pelham, N. Y., Sept. 20.
National Association of Petroleum Retailers, annual meeting, St. Louis, Sept. 27, 28 and 29.
Ohio Petroleum Marketers Assn., fall conference and golf tournament, Youngstown, O., Oct. 5, 6.
Society of Automotive Engineers, national regional fuels and lubricants meeting, Tulsa, Okla., Oct. 6 and 7.
Indiana Independent Petroleum Assn., Fall convention, Hotel Severin, Indianapolis, Ind., Oct. 12 and 13.
Independent Petroleum Assn. of America, Tulsa, Okla., Oct. 19, 20 and 21.
Oil Trades Assn. of New York, annual banquet, Waldorf-Astoria Hotel, New York, Nov. 1.
National Automobile Show, Grand Central Palace, New York, Nov. 11 to 18.
National Motor Truck Show, Port of New York Authority Bldg., New York, Nov. 11 to 17.
Society of Automotive Engineers, annual dinner, Commodore Hotel, New York, N. Y., Nov. 14.
American Petroleum Institute, 19th annual meeting, Stevens Hotel, Chicago, Ill., Nov. 14 to 18.
American Society of Mechanical Engineers, Philadelphia, Pa., Dec. 4 to 9.
Exposition of Chemical Industries, Grand Central Palace, New York, Dec. 4 to 9.
Nebraska Petroleum Marketers, Inc., Omaha, Nebr., Dec. 6 to 8.

Kansas City Distributor

KANSAS CITY, Mo., May 31.—An oil marketing department has been opened by The Carter-Waters Corp., at 2440 Pennway here, jobber, now handling construction materials.

The new department will market gas and fuel oils, diesel fuel, burning oils, tractor fuels, naphthas and gasolines, and lubricating oils. Robert M. Forbes will be in charge, with Harry G. McKowen as his assistant.